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Vol. XIV
No. 4

INDUSTRIAL-ARTS MAGAZINE

April,
1925

Incorporating: HANDICRAFT and the ARTS AND CRAFTS MAGAZINE

Published Monthly by
THE BRUCE PUBLISHING CO.
354-364 MILWAUKEE STREET
MILWAUKEE, WIS.

NEW YORK: 30 CHURCH ST.

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SUBSCRIPTION INFORMATION—Subscription price, $2.50 per year, payable in advance. Canadian and Mexican postage, 35 cents, foreign countries, 50 cents. Copies not over three months old, 30 cents; more than three months, 50 cents. Notice for discontinuance of subscription must reach Publication Office in Milwaukee, at least fifteen days before date of expiration. Changes of address should invariably include old as well as new address. Complaint of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

EDITORIAL CONTRIBUTIONS—The Editors invite contributions bearing upon Industrial-Arts Education, Manual Training, Art, Domestic Science, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

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THE INDUSTRIAL ARTS MAGAZINE

Volume XIV APRIL, 1925 No. 4

Some Problems in Establishing a Vocational Program in the Senior High School[1]

L. A. Emerson, Joliet Township High School

IN approaching a subject of this sort covering such a wide range of activity, one must necessarily limit himself to a portion of the field which can be treated at least in a general way in the time available. Vocational education in the senior high school covers a wide range of work. If we accept the commonly used classification we shall include commercial education, agricultural education, home economics education and trade and industrial education as parts of a general vocational program. In approaching this subject, it seems advisable to present certain problems in connection with just one phase of this work, namely that of trade and industrial education. The principles which apply to the establishment of such courses, and the problems which arise in that connection, are very much the same as those which present themselves in connection with other forms of vocational work.

To still further delimit the field, this paper will be confined primarily to problems which arise in establishing trade and industrial education in the township high school as it exists in Illinois. This presents the problem of establishing a vocational program as a part of a cosmopolitan high school, a job which is somewhat more difficult in many ways than the establishing of a similar program of vocational work in an independent vocational school. With these limitations in mind let us look at some of the problems involved in establishing such a program.

In every form of activity, whether it is in the field of business or industry or recreation or education or what not, one must have objectives toward which he is working. Otherwise, the efficiency with which he works will be low, and the work which he accomplishes will be meagre. In the educational field we are beginning to realize more and more that objectives are fundamental, that true education comes only when definite objectives are set up and just as definite efforts are put forth to attain those objectives.

The word vocational education implies a very definite objective, that of preparing some one for effective entrance upon or improvement in some wage-earning pursuit. America today has an immense number of different activities in which persons are profitably employed. The first problem then which is raised to the school administrator, considering establishing trade and industrial training in his school, is the large problem of determining what his objectives shall be. One of the first things which might well be undertaken in connection with the solving of this problem is a survey of the community in which the school is located, with the idea of determining the kinds of vocational training needed by the community. This need not be, and usually should not be, a long-drawn-out comprehensive survey requiring a large corps of workers and a large expenditure of money. Preferably, it should be an overlook of the city which can be made from existing records and a reasonable amount of actual investigation. The Association of Commerce usually has information of considerable value; the local labor organizations may contribute; possibly the census would have some things of interest. This survey should be made with a view of determining the outstanding needs, in this case particular reference being given to the needs of trades and industries.

This survey will bring to light a great deal of information and will probably show a wide diversity of industrial employment. The next problem involved is that of determining which of these different lines of activities it will be practicable to train for. It is obvious that the school cannot hope to handle the training of all kinds of industrial workers. Certain kinds of industrial training can never be given in schools on account of the immense expenditure necessary for equipment and because of the comparatively small number of persons employed in certain specific lines. Thus, the school must choose those lines which can be handled within the school and for which there is a demand for workers. The size of school, the general attitude of the community toward industrial work, and the amount of money available will all come in as factors in determining the kind of training.

There are certain outstanding needs in most communities which the school should carefully consider before going further. In the first place, the school is

[1]Read before the Illinois Conference of Secondary Schools, December, 1924.

interested in training for the skilled trades rather than for the semi-skilled, as in the latter case workers are trained in a few processes in a comparatively short length of time. Every community has automotive repair, printing, and the building trades, including plumbing, carpentry, and electrical work. Many communities have machine shops, foundries, etc. The determining factor then as to whether these should be established in the high school will be whether the community demands for new workers in these fields are sufficiently great to warrant the establishment of the courses. Cities which are dominated by one or two large industries will often find in those industries a very definite kind of training which the school can meet.

After a decision has been reached in a general way as to which line of industrial work the school should attempt, the next problem is the setting up of definite objectives in these specific lines. One may raise the question as to whether the aim should be the up-grading of persons already employed in these industries or the training of young workers to effectively enter these industries. These are different problems, the one calling for trade extension training in part-time or evening classes, the other calling for trade preparatory training, usually given in day classes. This problem is further complicated by the necessity of setting up specific objectives within the trade itself even after the objective from the workers' side has been determined. Thus, in a plumbing school, will you place the emphasis on lead work or will you place it elsewhere? In carpentry, will you devote the training exclusively to rough carpentry of a more general sort or will you go into more detail in fine interior finish? In the printing shop, will the aim be to develop all-around printers or will attempts be made to specialize in hand composition, machine composition or press work? In working out a solution of this problem it is well to utilize the expert help available from the State Department of Vocational Education and from the industries themselves taking into account both the employer and the worker. Advisory committees are often a very valuable means of getting the specific objective of the trade or industry properly outlined.

Naturally, the specific objectives for the different trades will be somewhat determined by the objective previously outlined, as to whether the training will be trade extension or trade preparatory. Thus, in trade extension classes in evening school, a great deal more theoretical work can be given than is the case with trade preparatory classes in the day school.

The next logical step which presents problems is the building of the curriculum. Too often we have built our school building, bought our equipment and then laid out the curriculum and the individual courses of study. This seems to be getting the cart before the horse. The logical method is to determine what to do and then provide means of doing it. Thus, if this is not done, the curriculum often has to be adapted to the building rather than to the needs of the pupils who are to be trained.

If we should take a parallel in industry, we might think of a situation where the board of directors laid plans for a building and equipped it with machinery and then called a meeting to decide whether the product of the plant should be locomotives or Ford jacks, both of which are products of a metal working industry. This is, of course, a very unreasonable illustration as such a thing would probably never occur in industry, and yet I firmly believe that this thing has happened in educational work more than once.

Building of the curriculum will naturally present the problems of choosing the subjects to be taught, fixing the amount of time to be given to the training, and determining the relative proportion of time to be given to the different subjects. Again, we often resort to the practice of taking a definitely allotted time and dividing it up among the things which demand that time. In approaching an industrial education problem the scientific way seems to be to determine what the worker needs, to outline this in very definite form, to analyze the time requirement of each portion of the training, and then to make provision for the training needed. Of course, one has to take into account the time which is available, but my point is that we should approach it from an "objective-to-be-obtained" basis rather than "a-time-to-be-spent" basis. This may even mean that the industrial school day will be longer than that of the present day in the high school. If this be true, the problem should be definitely faced and arrangements made accordingly to provide the longer day.

In building the curriculum one should keep in mind the state requirements, if the school expects to operate under the vocational education law and receive reimbursement from the state department from either state or federal funds. The Illinois state plan, as is true with all other plans for vocational education, lays down specific requirements and these should be carefully considered when the curriculum is being worked out.

The next step which presents problems is the lay-out of specific courses which form the curriculum. Suppose our curriculum provides for fifteen hours per week of shop work, four hours per week of mathematics, four hours per week of science, three hours of related drawing, four hours per week of English and civics. The shop work may be given in a variety of ways and may cover a wide range of work. Hence, we must lay out specific courses in each of these courses.

Again, we get back to objectives. The individual course should have as its foundation the objectives which are sought. The whole course then should be laid out with a definite view of attaining these objectives, not simply of requiring the boy in the shop or class to go through a certain series of exercises or recitations. Here again the advisory committee can greatly assist the school people, particularly with reference to the course content of the shop subjects and the immedi-

ate related subjects. Too often our related subjects are related to nothing in particular, and our shop teaching consists of keeping the boy busy along a general line in the particular shop.

One problem which presents itself in the matter of related subjects is whether these subjects should be taught by the shop instructor in the shop or whether they should be handled in mixed groups from all the shops under the direction of a separate teacher. There are advantages both ways. This problem will present itself again when the schedule is worked out.

After the general survey has been made, certain lines of activity selected for training, the objectives in these lines defined, the general curriculum worked out and the details of the courses of study outlined, then it is time to think of equipment and building, because after all the equipment and the building are determined by the objectives to be obtained.

What are some of the problems in connection with equipping a school to handle trade and industrial training? In the first place the equipment ought to be of a type which will enable the shop work to be handled on a useful or productive basis. The machinery should be of the type used by the better industrial plants in the city in which the school is located. If boys are to be trained to go out into industry they ought to work on the kinds of machines they will run into when they get out on to the job. This factor enters into the evening school program in a vital way for men will not come in to a school for evening classes if they have to work with obsolete equipment. The equipment then should be up-to-date and should be of good quality, though not necessarily the highest priced on the market.

The building should be planned to fit the equipment. This is, of course, not always possible, but it should be done wherever conditions make it possible. Thus, the print shop should be designed to hold the weight of a Miehle press, should be well lighted and should have provision for heat even though other parts of the building may be shut off. The electrical shop should be located so that adequate electric power will be available. The plumbing shop should have provision for exhaust fan equipment that will carry off the smoke when soiled pipe joints are being burned out.

After the equipment has been definitely determined, it is often a good plan to cut out card-board shapes to a definite scale, which shapes represent the floor space required by each machine. These can be arranged on a blue print of the proposed shop to determine whether the space will be adequate. This plan is also valuable in any re-arrangement in equipment, particularly in cases where the equipment space is definitely fixed and it is necessary that the equipment be located within this space.

One vital problem in connection with the building is that we provide adequate services in the way of gas, electricity, water and drainage. Another item which affects certain shops is flue capacity for carrying away smoke and gases. An elevator of adequate size, to handle the larger pieces of equipment, should be a part of the building. Provision for receiving and storage of shop supplies is another important item, as also the provision for grade entrance for the automotive shop, and extra wide doors with grade entrance for the carpentry shop, if the plans include any actual building projects within the shop itself which projects later are to be taken out and sold.

Adequate washroom facilities should be provided, which should preferably be of an industrial type. In this connection it might be well to state that, in most cases, it is advisable to make shops conform to industrial requirements rather than to the fine finish practice of most of our high schoolrooms and corridors. That is, the shoproom should be adapted to the work which is to be done in it. If it is too highly finished it will require too much care and maintenance, resulting in an inefficient program. Shoprooms in a new building should be made as flexible as possible with the use of temporary partitions, such as hollow tile or paneling. In general, the building should be so designed that certain minor changes can be easily made, and that additions to the various shops which come about through growth can be readily taken care of.

So far, we have said nothing about the problems incident to hiring the staff for the vocational work. The man who is to direct this work should be secured as early as possible. If he is expected to get results from the vocational program, it will be desirable that he have some voice in setting up the program, in choosing the equipment and in planning the general lay-out.

The staff should be as high grade as conditions will permit. Three general qualifications may be set up: trade experience, technical training, and teaching experience. The real problem is to secure men who have had adequate amounts of these different preparations. When all three are not obtainable the problem turns to that of deciding which one can best be sacrified, and again conditions will govern to a certain extent. Certainly in a vocational program adequate trade experience cannot be considered lightly. To be a success in any form of trade work the instructor must know what is done in the trade.

In the case of evening instructors it is often advisable to use the day school staff with additions of certain high grade workmen from industry who are willing to come in to the school and handle evening classes. The problem here is often lack of teaching experience and this must be compensated for by adequate supervision, supplemented by teacher training courses wherever this is possible.

In fitting a vocational program to an existing program in a cosmopolitan high school, one is confronted with a very definite problem of providing a schedule which will thoroughly integrate the vocational work. The advantages of a combined vocational academic program are many. The problems involved are also many in number and difficult of solution. Industrial training usually requires a longer school day than other high

school classes. This means that industrial students must come earlier or stay later or both. One scheduling problem is to so arrange the school program that these boys will not be deprived of extra-curricular activities open to other students. Usually the high school has a manual arts program in addition to the proposed industrial work. The schedule must provide for an integration of this program with the vocational program, with possibly both kinds of work going on in the shops at the same time.

Whenever industrial courses are established, students must be enrolled in those courses and this raises the problem of guidance machinery. Our high schools as a whole are deficient in this respect, but it is particularly necessary in the case of industrial students. Guidance machinery may take the form of try-out courses, classes in occupations, and personal advisement by persons properly trained. Right along this line comes the problem of placement which is another personnel function. Vocational courses are effective to the degree that students enter the lines of work they are trained for and stay with those lines. Proper machinery for placing boys on jobs is a vital factor, and not only the setting up of this machinery, but the working of it presents problems.

In summing up the problems presented in establishing an industrial program in the senior high school, we may list them as follows:

1. Determination of community needs.
2. Selection of kinds of training which are practical under the existing conditions.
3. Defining of objectives in the training selected.
4. Building of the curriculum.
5. Outlining the courses of study.
6. Planning, securing and installing equipment and building.
7. Hiring the staff.
8. Making the schedule.
9. Providing guidance machinery.
10. Placing the graduates.

Permeating the whole of the work which has been outlined above, is the big problem of selling this program. It must be sold to the board, the present faculty and the public. Perhaps none of these is more important than the others. Certainly the board has to be sold on the proposition and the academic faculty must be sold or the program will be short-lived. The second vital factor is the tying up of the program with the community. This factor is vital in keeping the program sold, in keeping it revised to meet changing community needs and in stimulating the growth of the industrial work. Lastly, if the program is to be successful in a community high school, the problem of integration must somehow be solved. Vocational students must be made part of the school just as definitely as are the academic students.

I have indicated here a few of the problems. Many other are involved, some of which are very complex, but these are some of the most important ones. The presentation given here has been very brief and very indefinite in many respects, yet I hope it has indicated a general procedure which, if carried through, will bring results.

Britannia Metal — XI

The Lighting Unit in Britannia

Professor William H. Varnum, University of Wisconsin

BEFORE terminating the Britannia Series, it seems worth while to submit a type of problem with aesthetic and constructive correlations of marked educational value for furthering creative effort, while the completed article will make for home economy. The problem, that of making lighting fixtures for the home, demands a background of knowledge such as the principle of modern home lighting, simplified for comprehension of secondary school pupils, constructive laws of wiring, insurance regulations and other city restrictions and of course, the necessary art metal work technic with which to complete the articles.

Of early illumination it can well be said that

> "'Twas a light that made
> Darkness itself appear
> A thing of comfort,"

although it is equally pertinent to many samples of contemporary lighting in which powerful exposed light sources, glaring walls and ceilings accompanied by black shadows and sharp cast shadows, coupled with poorly placed fixtures made darkness a distinct relief. In planning houses, few individuals consider the question of lighting until the time arrives for the purchase of fixtures. The fixture dealer primarily is concerned in selling and frequently is not competent to act in an advisory capacity, or to give judgment which guarantees an efficient and harmonious lighting plan. The architect frequently leaves the placing and selection of patterns to the owner, who becomes lost in his problem. Many architects and fixture dealers are unaware of the unconscious imprint poor lighting will leave on the health and disposition of the occupants of the house. The chief function of lighting is to make the house cheerful and attractive.

The home is comparable with the stage, delineating life's moods and activities. These activities usually reach their climax after daylight has ceased and artificial lighting is called upon to play its part. Thus, it is seen that lighting becomes active in furnishing the proper atmosphere or background to fit each mood or occasion. Upon humans, the psychological and physio-

logical effects of light are established past debate and play their parts in the dance, drama, architecture, decoration and music. In these activities, light furnishes an envelope to supplement action and the spoken word, occasionally rising to the importance of the leading rôle. If light is such a prominent factor in these arts, it becomes imperative that more attention be paid to the physical and emotional aspects of artificial illumination and their relation to home life—our permanent environment for so many social and family activities. The general indifference to lighting will succumb when the potentialities of correct distribution and coloring are made clear.

Correct residential lighting is controlled by a few simple principles coordinated with that feeling of individuality, which normally is associated with every artistically planned house. In a brief article, each room cannot well be discussed, but let us take one room as an example, and from it draw inferences as to the lighting of the other rooms.

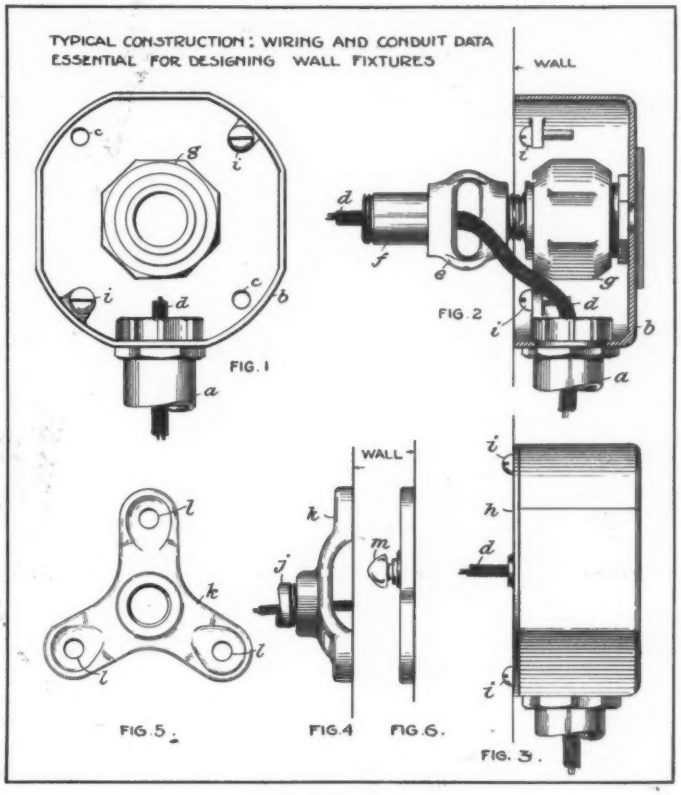


ILLUSTRATION 1.

Lighting the Living Room

This room becomes the setting for many functions ranging from a lively company engaged in cards or conversation, to quiet groups gathered for study or reading. In lighting this or any room, avoid a glare physiologically injurious, as conducive to eye strain and headaches; psychologically an error, as the result is inartistic, garish and far from restful. A prolific source of glare is the unshaded clear lamp whether in the ceiling, side wall bracket, or in a poorly designed reading lamp, with its exposed bulb, producing annoyance to vision, discomfort and ill temper to both guests and members of the household. A centrally placed ceiling fixture for the living room is not free rom criticism, as its position suggests symmetrical treatment out of harmony with the usual placing of the furniture, while this sources of illumination fills the room with unnecessary brilliance, casting heavy shadows under the furniture and leaving little of that charm of soft light and shade or modelling inherent in good lighting. In the long run, living room ceiling sources of light become monotonous and fail to adapt themselves either to the mood of the individual or to the spirit of a group. With the modern tendency toward low ceilings, their direct or indirect brilliont illumination is apt to become tiresome.

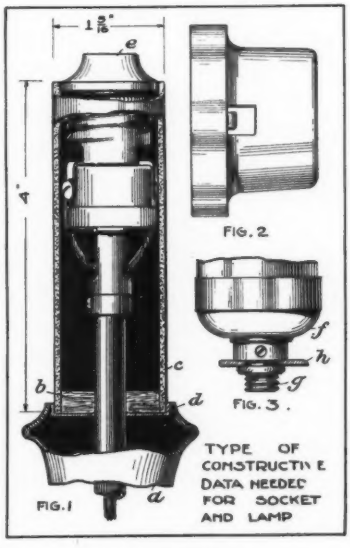


ILLUSTRATION 2.

The happy solution is in a system of lighting sufficiently flexible to adapt itself to the dual uses of the room. Following the practice of stage lighting, two methods are used. (A) *flood lighting* from wall fixtures shaded to prevent glare on the walls and sufficiently low in wattage to eliminate over brilliant spots on the ceiling, although the latter may be dimmed by covering the tops of the shades. The flood method of lighting is adequate for occasions which demand general illumination while the color of the lighting scheme (see following article) may be made to fit the spirit of the group. (B) For reading or study, spot lighting by portable decorative table and floor lamps is an excellent practice, leaving the remainder of the room partly dark, a factor making for concentration and rest.

By having both methods in a room and using either arrangement alone or in combination, marked flexibility is secured, ranging from concentration to general distribution. The plan requires from four to six baseboard outlets for portable lamps, and a number of wall brackets each controlled by a chain pull switch. On the plea of economy, this outlay may seem excessive but

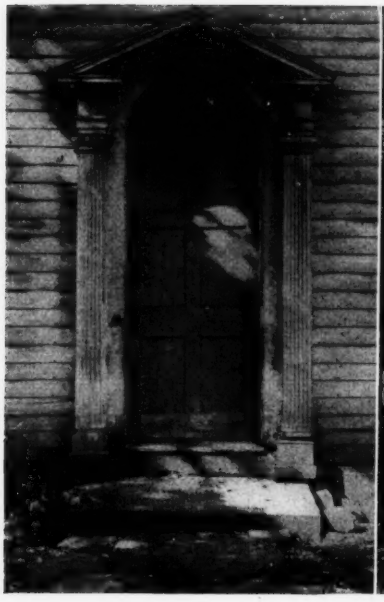


ILLUSTRATION 3.

ILLUSTRATION 4.

ILLUSTRATION 5.

additional outlets cost little, if added at the time the house is built.

Summarizing the present facts, we have what might be called Rule 1: avoid glare; Rule 2: adapt illumination to use of room; Rule 3: in general lighting by wall brackets avoid 'spotty' lights and shadows by careful adjustment and shading of wall brackets. Try for a pleasing tonality. Rule 4 is self-evident. Lighting fixtures should harmonize with the architectural features of the room.

As the usual small city fixture stock is limited and expensive, economy may be practiced and individuality of expression achieved by making the fixture of britannia as an art metal class project. It is excellent practice for pupils as potential house owners, to use architects' house plans by cutting out paper to represent the various pieces of furniture comprising the equipment of a room. With this visual aid in picturing the room, move the pieces around the plan, adjusting them to fit portable lamps and wall fixtures until the arrangement suggests an efficient, cheerful and artistic whole, thus giving the key to proper locations for base board outlets and wall fixtures.

ILLUSTRATION 6. CORBIN COLONIAL HARDWARE. NOTE DESIGN. CORRELATION WITH LIGHTING FIXTURE—FIG. 3.

Constructive Wiring Data

With this brief introduction to the science and art of living room lighting as a part of the designer-craftsman's background of knowledge, he must add information of electrical appliances directly connected with lighting fixtures. Most city and insurance wiring rules stipulate the use of conduit wiring, or the enclosure of all light wires within metal pipes or conduits, as in *a*, Figures 1 and 2, Illustration 1, thus lessening the fire hazard from short circuits. Upon reaching the location of a wall bracket, the conduit pipes are fastened by lock nuts to outlet boxes, *b-b*, Figures 1 and 2, fastened by screws passing through the screw holes *c-c* to the frame work of the house. For hanging lanterns or other fixtures extending some distance from the wall, an attachment shown clearly in Figure 2, Illustration 1, is used. The wires *d* pass from the conduit *a* through a hollow fixture *e* termed a 'hickey' into the extension pipe *f*, and and hence to the lantern or other lamp socket. The pipe *f* and the wire *e* are insulated from the conduit box by the nut *g*, made of insulating material. The outlet box and hickey are concealed by a canopy or dome usually fastened by a set screw to the pipe *f*. This hood, while not illustrated, is readily to be seen on porch lanterns and many interior fixtures.

If a fixture fitting closely to the wall surface is desired, the extension pipe no longer becomes necessary. A cover plate *h* Figure 3 is fastened to the outlet box by the screws *i-i* while the wire *d* passes to the fixture socket through the hole in the plate center.

For non-conduit construction leading to extended fixtures, the wires pass directly through the plaster into pipe *j*, Figure 4, attached to a 'crowfoot' casting *k* which spreads out as in Figure 5 and attached directly to the plaster of the wall by screws through holes *l-l-l*, Figure 5. Hoods or canopies cover the crowfoot in exactly the same manner as explained in conduit construction. For

wall brackets fitting quite closely to the wall, a flat crowfoot, Figure 6 with the wires passing directly to the lamp socket supplies a method of securing the fixture to the wall. Note the ornamental set screw *m* which presumably passes through a rosette or similar ornament and hence into a tapped hole in the crowfoot, securing the entire design firmly to the wall.

There are objections to the use of candles in lighting fixtures, the objectors claiming them to be imitations and shams. Depicted with realistic candle drippings, they are decidedly in poor taste. Conventionalized, with decorative lamps, they are less objectionable and are found in the best commercial fixtures. Illustration 2, Figure 1 shows a vertical cross section through a

PLATE 1.

candle, with the method of insertion into the ornanent *a*. A small cylindrical plinth of wood *b* inserted into the bottom of candle c is held by small wood screws to the metal box *d*, which in turn fits into the ornamental feature *a*. A porcelain reduction plug *e* allows the candle to be used for smaller lamps.

Figure 2, Illustration 2, is the usual porcelain lamp socket receptacle, valuable in fixture construction, while Figure 3 shows a method of fastening lamp sockets to lanterns or other flat pieces of metal. In Figure 3, *f* is a portion of the lamp socket, *n* a cross section of the lantern top or flat plate while *g* is a commercial nipple which, screwing into socket *f* holds the lantern *h* firmly to the lamp. Attached to a pipe, this fastening has a wide range of applications. All wiring joints are securely soldered and insulated, and no wire should pass through a piece of metal with sharp edges, or through wood, without being protected by the usual commercial insulator.

The preceding illustrations show how any fixture design must be adapted to the electrical work in the house and indicates the type of data one must have to secure safe and workable fixture designs. Dimensions of lamps, sockets and the simple data are readily secured from the objects.

The Fixture Designs

While many problems in portable lamps and showers are possible, this article is restricted to wall brackets. Let us suppose the house to be Colonial in spirit, with a living room ornamented in a rapport. The pencil sketch as of Figure 4, Plate 1, shows the predominance of straight lines in Colonial architecture with its hint of the classic; the delicacy of its details. The front entrance doors, as well as the living room doors, of our hypothetic house are planned as adaptations of similar Colonial doors with their fine fan-shaped transoms often seen in old New England houses of which Illustration 3 is an example. The engaged lantern of Figure 1, Plate 1, is based on Colonial lines in harmony with the house contours. The fan-transom motive from the doors is repeated, or re-echoed, in the upper part of the lantern in the form of pierced enrichment, united to the contours by small chased areas. By using sanded glass of heat-resisting qualities directly behind the pierced areas, one will secure the diffused light necessary for general lighting while, if more light is needed, the sides may be pierced and treated like the front.

A small knob or finial, (a Colonial detail often used to point a spire or gable) is placed on the top surface with a similar one at the base. These are threaded and screwed into angle pieces projecting from the wall surface. Not only do they hold the fixture to the wall but allow for its removal in changing or cleaning lamps. The moulding is made in sections, by beating down sheets of britannia into hard maple forms, grooved to the proper shape. These moulds which are soldered to the body of the fixture are allowed to run to the wall for added strength. The receptacle of Figure 2, Illustration 2, mounted on a piece of insulating material, may be utilized to hold the lamp of low wattage. While much conventionalized, this lantern will re-echo the appearance of light streaming out through the entrance way of a Colonial dwelling. Made from copper, it would serve as an entrance lantern.

The writer believes Figure 2, Plate 1, to be a new, simple and inexpensive form of fixture adapted to school metal practice. It is designed to fit closely to the wall surface and to appear in close unity with it. The dotted lines of Figure 2 indicate what might be termed an outlet box, with circular ends, the conduit and its wires entering directly into the lower extremity. Small nickeled screws in the top and bottom keystone projections attach the ornamental plate either to the wall, or to lugs on the outlet box. Sanded or art glass back of the plate diffuse the light and mask the interior. Britannia of at least one-eighth or three-sixteenths of an inch in thickness is necessary to give a sense of solidity and permanence. The Colonial doorway again has been taken as a motive, adapting not only the transom lights but the side light panels as well, reminiscent of Illustration 4, together forming an architectonic motive in harmonious relationship to the house.

Figure 3, Plate 1, is a lighting fixture based on the Colonial candle-stick, with the front projection forming a shield, cutting off the direct glare from the lamp. With interest primarily centered in the contours, the broken pediment (Illustration 5) composed of two opposed volutes becomes the controlling motive. With the interest confined to the contours, little surface enrichment is to be attempted, thus a small amount of chasing raises the reflector, balanced by two small chased Colonial motives. The pattern above the reflector is an adaptation of the well known pineapple design, with imbricated leaves simplified from the original in Figure 4. A small turned finial completes the curve of the base. The entire fixture may be attached to the wall by concealed screws although no objections are to be seen in their visible use, provided they are tinted and finished to harmonize with britannia and located at decorative points in the structure. As they are used in fine hardware, what valid protest can be directed against their frank use in fixture construction? Naturally it is better to conceal them and leave an unbroken surface, if such treatment is possible.

The preceding problems illustrate the possibilities for original and more harmonious lighting fixtures, the development of the creative imagination, and establishment of relations to coordinated occupations, making an ideal art metal problem. In this article little has been written of the possibilities of color, the creation of color melodies for social and domestic activities, or the powerful effect of colors on life through light. We must leave these for the next article.

Industrial Mechanics

A Course for Three-Year Academic High Schools

J. H. Trybom, Assistant Director in Charge of Vocational Education, Industrial and Household Arts, Detroit, Mich.

THE organization of the junior high schools with their enlarged facilities for shop work, and the gradual elimination of the ninth grade from our academic high schools, have brought new problems to the teachers of industrial arts in these schools. To avoid repetition and, at the same time, to adapt the instruction to the needs of the students of the tenth, eleventh and twelfth grades, a reorganization of courses of study in the industrial arts was inevitable.

After many serious attempts and discussions on the possible solution of these problems, by the heads of our departments in these schools—Messrs. L. G. Burgess, H. N. Eddy, E. G. Fuhry, Robert D. Gould, E. L. Holmes, E. L. Mote, Wm. A. Sargent and T. C. White, Supervisor F. R. Kepler, and Mr. M. L. Byrn, now of the University of Michigan—an experiment was begun at the Southeastern High School in 1922 under the direction of Mr. Robert D. Gould. At present there are four high schools carrying out some phase of industrial mechanics. An apology for the name we have given these courses may be in order. Without extending this discussion, let me say only that this name was born at one of our meetings two years ago.

One of the outstanding reasons for offering these new courses in industrial mechanics in an academic high school is to meet the increasing demand for industrial information as a supplementary education in a large number of professional, commercial and industrial callings, such as law, salesmanship, office positions in manufacturing plants, drafting, and the like. Greater efficiency in many of these callings is attained by a knowledge of tools, materials, operations and principles underlying production.

To ascertain the actual need for a course of this nature, a survey, involving interviews with over two hundred representatives of professional, commercial, and industrial interests, was made in 1923.[1] This survey demonstrated that these men were mutually agreed as to the desirability or necessity of having our secondary school pupils acquire:

1. **Technical knowledge** pertaining to the understanding of tools, machines, materials, operations and principles involved, with special reference to the needed applications to each class, group and individual concerned.
2. **Vocational knowledge** pertaining to the conditions, processes and relationships in present-day commerce and manufacture; and that this knowledge should be provided through concrete experience and related study.
3. **Occupational knowledge** pertaining to the nature of work, qualifications and training, labor conditions, health problems, future opportunities, and the like, in connection with the other studies as a basis for the intelligent choice of study and life work.

In this connection, it should be pointed out that the large majority of the persons interviewed insist that this type of purposeful education and training in the principles of applied science, mathematics and mechanics will provide for more rapid advancement in each occupation chosen.

Another outstanding result of these courses is an intelligent understanding of the industrial world surrounding us. This knowledge probably forms a better means of contact with the men we meet than the knowledge acquired in any other subject of the high school curriculum.

Knowledge that can be applied and made use of continually in this way would seem to contain, to a great extent, the cultural values constituting one of the aims of a high school education.

Contents of Courses

A study of the principal industries of Detroit furnishes the content of the industrial mechanics courses, i. e., the metal industries, automobile manufacture, the building industries, electrical power and construction, and the woodworking industries.

In general the instruction deals with the following problems:

1. The relative importance of the industry in the growth of the city and its relation to other industries.
2. How the raw materials used in the industry are affected by different processes in their manufacture.
3. The organization of plants, through visits and discussions.
4. How the common tools and machines are operated, given through practical experience in school shops.

A. *The Metal Industries.* The blast furnaces, foundries, brass and copper mills, machine shops, and the sheet metal industries are studied; how iron, steel, copper, brass, sheet metal are affected by different processes in the manufacture.

The great industrial development of Detroit has been gained by means of the metal industries. The principal products of our city issue from the machine shops, the forge shops, and the foundries. These industries have been the main factors in making Detroit what it is today, one of the outstanding manufacturing cities of the world.

It would seem that the cultural value alone of this information, leading to a knowledge of the principal factors in the growth of our city, would make this instruction well worth while for every Detroit boy.

B. *The Automobile Industries.* There are over 15,000,000 automobiles in the United States today, and the number is steadily increasing. There is not another phase of our industrial development that so directly and indirectly affects so many people as does the manufacture, use and maintenance of the automobile.

Our entire amazing industrial development of the

[1] This survey was under the able direction of Professor A. H. Edgerton, now of the University of Wisconsin, and paragraphs numbered 1, 2 and 3 are his conclusions from the survey.

last half century is the outgrowth of a vast increase in the knowledge and use of scientific principles. The study of the automobile as a unit of subject matter in industrial mechanics, offers an unusually fertile field for the student to satisfy his natural craving to know the "how" and "why" of some of the simpler elements of physics and chemistry. In this form of instruction these sciences become a part of the life of the pupil. He learns their underlying principles with a very keen interest and not as cold, abstract problems, because he can see their intimate and practical application.

C. *The Building Industries.* By actual work with building materials and through class discussions, the student learns how building is actually performed in his community; also the value of different materials for different purposes. This enables him to tell good construction from bad, and is a decided aid in case he wishes to build for himself or buy a house later in life.

He learns to read intelligently blue-prints and specifications for simple buildings, and to make his own sketches and estimates. In addition he is taught what is meant by such terms as abstract, deed, contract, lien, release, etc., and to employ this knowledge for his own protection. He also acquires some knowledge of modern methods of financing a building. Through a study of the building code he learns the requirements demanded by the city.

As almost every man in our great city is interested in owning his own home, it sounds logical to say that the great majority are interested in knowing the important things to look for when judging a building or in looking after it while it is under construction.

C. *Electrical Construction.* The work in the electrical unit of the industrial mechanics course is designed to carry with it information of a cultural value, vocabulary, and some insight into the practical work which is involved in electrical construction.

It gives a vocabulary of technical terms and expressions, enabling the possessor to discuss intelligently ordinary electrical matters. It acquaints him with such things as high and low voltage, loads, transforming, induction, etc. It furnishes a conception of the work already done in the field of electricity, and gives an idea of the lines which future research and invention are apt to follow.

It acquaints him with the dangers involved in electrical things, teaching him where there is danger and where there is not. It illustrates the principles of electricity in such common apparatus as motors, generators, transformers, radio, treating these subjects on the engineering level rather than from the tinkering angle.

It gives him a chance to try his head and hand at electrical thinking and doing, furnishing him some criteria by which to judge his aptitude for endeavor in this field of work, helping him to determine whether or not he wishes to follow it as a career.

E. *The Woodworking Industries.* Although the woodworking industries may have contributed less to the growth of our city than the metal industries, some knowledge of the use of our common woodworking tools and of the relative values of the various materials used in these industries would seem to have a significance justifying them as part of the industrial mechanics courses. Pattern making has been of special importance in the growth of our city.

Organization of Instruction

The industrial mechanics courses are outlined for four semesters' work, five 45-minute periods per week, and are designated as "Industrial Mechanics 1, 2, 3, and 4."

The first year is devoted to a definitely outlined course of study covering a general survey of all the industries, or as far as the school equipment allows. During the second year, opportunity is given to students to specialize in some chosen activities for which they show special aptitude and interest.

The instruction is given in a "general" shop with a great variety of equipments for the various lines of work, or in the specialized shops now equipped in most of the high schools, by organizing the instruction in such a way that it shifts from one shop to another.

The information represented by these courses is provided through suitable printed matter and reference material, group excursions, student reports, class discussions, talks by specialists, and shop practice.

Manual Training for Boys, Age Level 12—15

Chas. E. Limp, Madison, Wis.

BEFORE a constructive criticism can be made on the subject of manual training, as given in our schools today, one should know (1) the nature of the courses of study, aims and purposes, how and in what degree they function in meeting the needs of the children; (2) the character and training of men in the field. Those of us who have been in the field quite a number of years know, in certain respects, the answers to the above. We often think of subject matter and its selection only in terms of the community, or city, or portion of a city, with regard to the nature of the industries, but Ayres has revealed that only one father in six of all the 13-year-old boys in the schools of 78 cities studied, was born in the city where he now lives, and only about half of the boys were born where they live.

We think of aims and talk of objectives, but give cut-and-dried courses of study as for a typical boy, or all boys (in a very large number of schools the only medium up to and through the eighth grade being woodwork). And we hand out the work in side dishes, as it were, in uniformity of projects (and too often products

in the way of boys); every boy is required to make the same conventional "broom-holder" and "coat-rack" that his brother made a year or two previous, regardless of the fundamentals in industry, his need or interest in the project, of individual differences, or taking into account those who leave school at the close of the eighth or ninth year. For those who are to continue and finish high school, the subject matter in grades seven, eight and nine, need not be so diversified, as for those who go into the industries at the completion of some one of these grades. For these the course should be specific and flexible.

To ascertain the nature of industrial work being done, the number of periods per week given, and the number of minutes per period, the writer made a survey in 1920, of 72 junior high schools in eighteen north central states.

Data were secured only from those high schools which had been reorganized on the 6-3-3 plan such as Vincennes, Indiana, Kalamazoo, Michigan, and Red Wing, Minnesota. Most schools were offering more than one form of activity.

The table below shows the nature of the work given in these junior high schools, the number of schools giving each, and whether required or elective. For example, in the seventh year bench woodwork was given in 63 schools; in eight of these schools the work was elective, in 55 the work was required.

Subjects	Seventh Year El.	Seventh Year Req.	Seventh Year Schools	Eighth Year El.	Eighth Year Req.	Eighth Year Schools	Ninth Year El.	Ninth Year Req.	Ninth Year Schools
Bench Woodwork	8	55	63	9	48	57	46	9	55
Cabinet Making	3	24	27	8	37	46	50	9	59
Mech. Drawing	6	25	31	5	37	42	45	7	52
Carpentry	3	12	15	4	16	20	24	0	24
Printing	2	5	7	3	9	12	13	4	17
Sheet Metal	1	3	4	0	4	4	3	1	4
Machine Shop	1	1	2	1	2	3	7	1	8
Machine Drawing	0	2	2	3	2	5	18	0	18
Blacksmithing	1	0	1	1	3	4	8	1	9
Wood Turning	1	0	1	1	0	1	2	1	3
Cement Work	1	0	1	2	1	3	2	1	3
Elec. Const				0	2	2	0	1	1
Book Binding							1	0	1
Brick Laying							1	0	1
Pattern Making							1	0	1
Pottery				1	0	1	1	0	1
Molding							1	0	1
Caning							1	0	1

The number of weeks devoted to each subject falls easily within three distinct divisions of 9 or 10 weeks; 18 weeks, 19 weeks or 20 weeks; and 36 weeks or 40 weeks, according to the length of the school year. As nine or ten weeks is the unit of time for a given subject in the junior high school such subjects as brick-laying, pottery and electrical construction, usually require one unit. Other subjects such as printing, sheet metal work, blacksmithing, machine drawing, elementary machine shop work require two or four units, while other subjects such as bench woodwork, cabinet making and mechanical drawing are usually given the entire year. The average length of time devoted to industrial work in the seventh grade, is four 45 minute periods per week, two double periods; in the eighth grade, for bench woodwork, cabinet making and carpentry six 45-minute periods per week, or three double periods, and in the machine drawing, printing, sheet metal work and blacksmithing, four 45-minute periods per week, or two double periods; in the ninth grade ten 45-minute periods per week, or five double periods.

In practically all schools reporting, work in the seventh and eighth grade is required; in the ninth grade the work is elective.

Possibilities for an Industrial Course for any Junior High School

	Weeks Per Year	Days Per Week	Hours Per Day
Seventh Grade			2 45-Min. Periods
Bench Woodwork	36	2	2
El. Cabinet Making	18	2	2
Mechanical Drawing	18	2	2
Printing	9	2	2
Sheet Metal Work	9	2	2
Eighth Grade			
Woodwork	36	3	2
El. Cabinet Making	18	3	2
Mechanical Drawing	18	3	2
Printing	18	2	2
Sheet Metal Work	9	2	2
Machine Drawing	18	2	2
Ninth Grade			
Bench Woodwork	36	5	2
El. Cabinet Making	36	5	2
Mechanical Drawing	36	5	2
Carpentry	36	5	2
Machine Drawing	36	5	2
Machine Drawing	36	5	2
El. Machine Shop	18	5	2
Printing	18	5	2
Sheet Metal Work	18	5	2
Auto Mechanics	18	5	2

With such possibilities as the above, in the seventh grade for instance, bench woodwork could be given 36 weeks, the entire school year, or it could be given 18 weeks and mechanical drawing 18 weeks or if woodwork had been given in grades 5 and 6, mechanical drawing could be given 18 weeks, sheet metal 9 weeks and printing 9 weeks. Similarly for grades 8 and 9.

In regard to the other factor, the present industrial teachers are inadequately equipped. They have little insight into industry and know few, if any, well defined trades. The demand for industrial teachers up to very recently has far exceeded the supply. Academic teachers and also others, with no previous teaching experience, were often called upon to attempt to teach industrial work, accounting largely for, in my opinion, the present status of industrial work in our public schools. We must not overlook the fact that there have been but few adequate teacher-training schools and the idea has not been sold to all those teachers who take up this work, to say nothing of the antagonism of many of the academic teachers, the superintendents of schools and the people in the community. The notion often prevalent among academic teachers that the boy, and many times the teacher, who engages in industrial work is intellectually inferior and not capable of doing high grade academic work, has done much to set back this advance but as they see more of the work, the skill required to produce the project and the methods of application carried over into other activities, they have a deeper regard for the subject, the boy and the teacher.

What we need is more adaptive and varied courses of study and better trained teachers. We should have all boys take the same kind of manual arts up to, and including the sixth grade, for general educational purposes. From then on there should be a differentiation of activities.

During the school year of 1920, the writer put into effect the following program in the West Allis Junior High Schools, West Allis, Wisconsin:

For eighteen weeks the seventh grade boys were given wire bending and cold metal work; the second semester, cement and clay modeling. In the eighth grade the first semester was devoted to sheet metal and plumbing; the second semester, to printing or woodwork. Three full hours per week were given and this work was required of most boys.

In the ninth year all work was elective, given five hours per week with a choice of continuing any activity or taking up new subjects introduced, such as: electrical work, woodwork, mechanical drawing or auto-mechanics. An attempt was made to give insight into the fundamentals of industry—often taking boys through industrial plants—to recognize individual differences and to take into account those who would leave school at the end of the eighth or ninth year by providing special work most adaptive to their interests and special needs.

What we need is better training schools for teachers, better equipped shops, more time, work largely elective, more sympathetic attitude on the part of superinendents of schools, better trained teachers with more intimate knowledge of industry. What we need in these grades are men of vision, men who have made a careful study of the problem, men who know boys, their interests and their aptitudes, men who can teach and select subject matter that will embrace genuine life issues and widely usable facts, and conditions in the classroom identical with real situations which life itself offers.

Saving Time Under the Dalton Plan

Carolyn H. Stern, Teacher of English, Manhattan Trade School for Girls

ONE of the advantages of the much discussed Dalton Plan of Education—a plan under which the students, following contract assignments, progress individually—is that it trains the pupil to budget her time.

Intelligent budgeting need not be limited to the pupil. There is much need for the teacher to so plan her day that she may be of the greatest help to the largest number of students. Perhaps the best way to illustrate this point will be to watch Miss Gray, an experienced teacher, during part of a morning.

The bell notifying students that academic laboratories are open, has rung, and in an unbelievably short time each seat is filled, so that the sign, "Laboratory Full" must be hung out.

With thirty students whose work must be guided, "heard" and credited in about 45 minutes, Miss Gray's hands seem full, but judgment and right planning will lighten this apparent burden.

We *take for granted* that several students have written their names on Miss Gray's list, signifying that they have work prepared and wish to recite to the teacher so that they may receive credit for their work. While waiting to be heard they go on with the next problem, thus wasting no time.

The first name on the list is that of Jenny who feels that she is ready with her problem—to pronounce a list of difficult words which she has found in her English assignment. This has meant consultation of the dictionary and an understanding of the necessary diacritical marks. Upon inquiry the teacher finds that four other girls are also ready to do the same work. Accordingly all five are called to the desk at once. While hearing the list of words the teacher has jotted down on a pad several words which have been mispronounced. She sends the group of five to their dictionaries, meanwhile calling to her desk Frances—the second name on the list—who has signified that she is ready to recite a spelling lesson.

As idle spelling of words whose meaning is unknown is worthless and a waste of time Frances has looked up in her dictionary all words of which she is not sure. In spite of this there are still four or five words whose meaning is not clear to her, so she comes to her teacher prepared with this list.

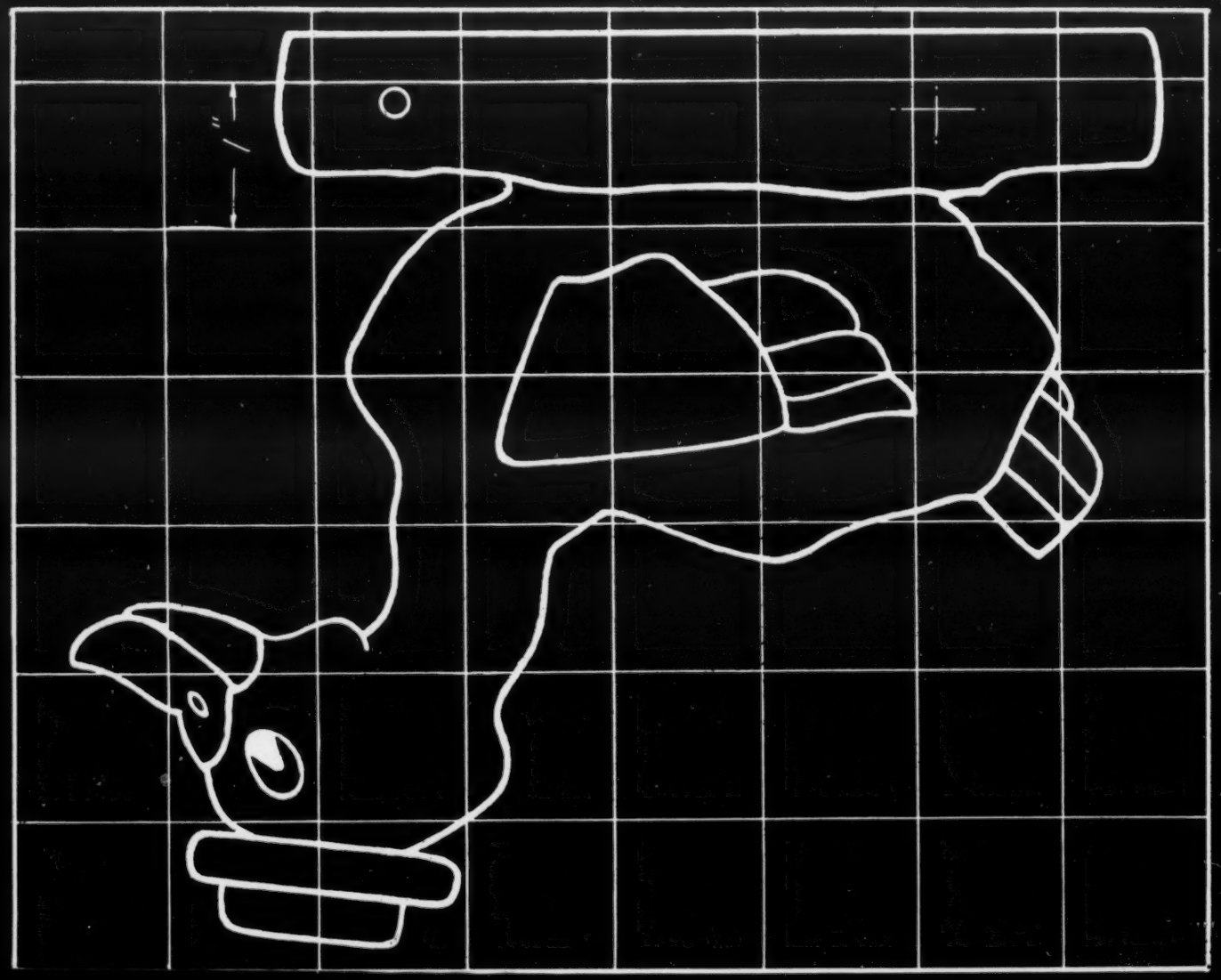
Teacher and pupil discuss these words. Then the teacher, wishing to test Frances on the work she has done, asks her the *meaning* of a number of selected words. To wait while Frances struggled through these words would be an unpardonable waste of time, so Miss Gray *dictates* to Frances a number of words which she is to use in sentences. Frances works with these words, standing at the teacher's desk while doing so, but saying nothing until she has planned *all* her sentences.

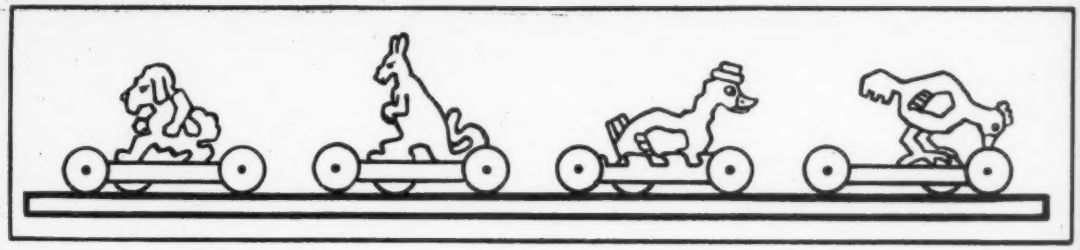
In the meantime the girls in Jenny's group have looked up the pronunciation of the words on which they failed and the teacher is able to dovetail this in between dictating Frances' work and looking at a composition brought to her by Alice (third name on the list).

The teacher and Alice go over the composition together, Alice indicating her own errors as the result of this conference. Much of the composition is correctly written and accordingly there is no necessity of its being rewritten, but Miss Gray feels that careful work by the pupil will improve certain paragraphs and so she is told to work these up.

While Alice leaves the teacher's desk to do this, Frances returns to recite her work in word study. The teacher may then dictate the spelling lesson, (or follow the method suggested in the next paragraph), Frances receives credit, and is dismissed.

But here another time saving device—albeit one of educational value—may be used. Let us suppose that the list Frances was given to study contained 50 words. It would take too long were the teacher to dictate all of these words to Frances, and still she does not want to omit any that may prove stumbling blocks. So Miss Gray suggests that Frances sit near the teacher's desk and





ANIMATED TOYS

Charles M. Rice, Everett, Wash.

Just as motion pictures cast upon the screen are more attractive to children than the still picture produced by the stereopticon machine, so are toys giving the illusion of life more interesting.

In the four toys reproduced in this article the action of an eccentric wheel is used to produce the illusion.

For "Bruno the Dog," the chicken pecking, and the Kangaroo, the eccentric wheel is placed in front, while in the remaining toy the pivot is in front and the wheel at the rear.

Base

The base consists of two sides $\frac{1}{2}$"x1"x10", two end pieces 1"x2"x2$\frac{1}{2}$" and four wheels 2$\frac{1}{2}$" in diameter. The side pieces for Fig. 3 are $\frac{1}{2}$"x1"x1$\frac{3}{8}$" and are cut to represent waves moving toward the duck.

The eccentric wheel (3) is the same diameter as the wheels on the base and the hole is bored $\frac{1}{2}$" from the center. The toy figures are held to the base by a heavy piece of wire (2) driven through the side pieces. Two short pieces of $\frac{3}{4}$" dowel (1) are placed on each side to keep the figure in place. If the base is made slightly wider, two empty spools may be used instead.

Supplement to the Industrial-Arts Magazine, April, 1925.

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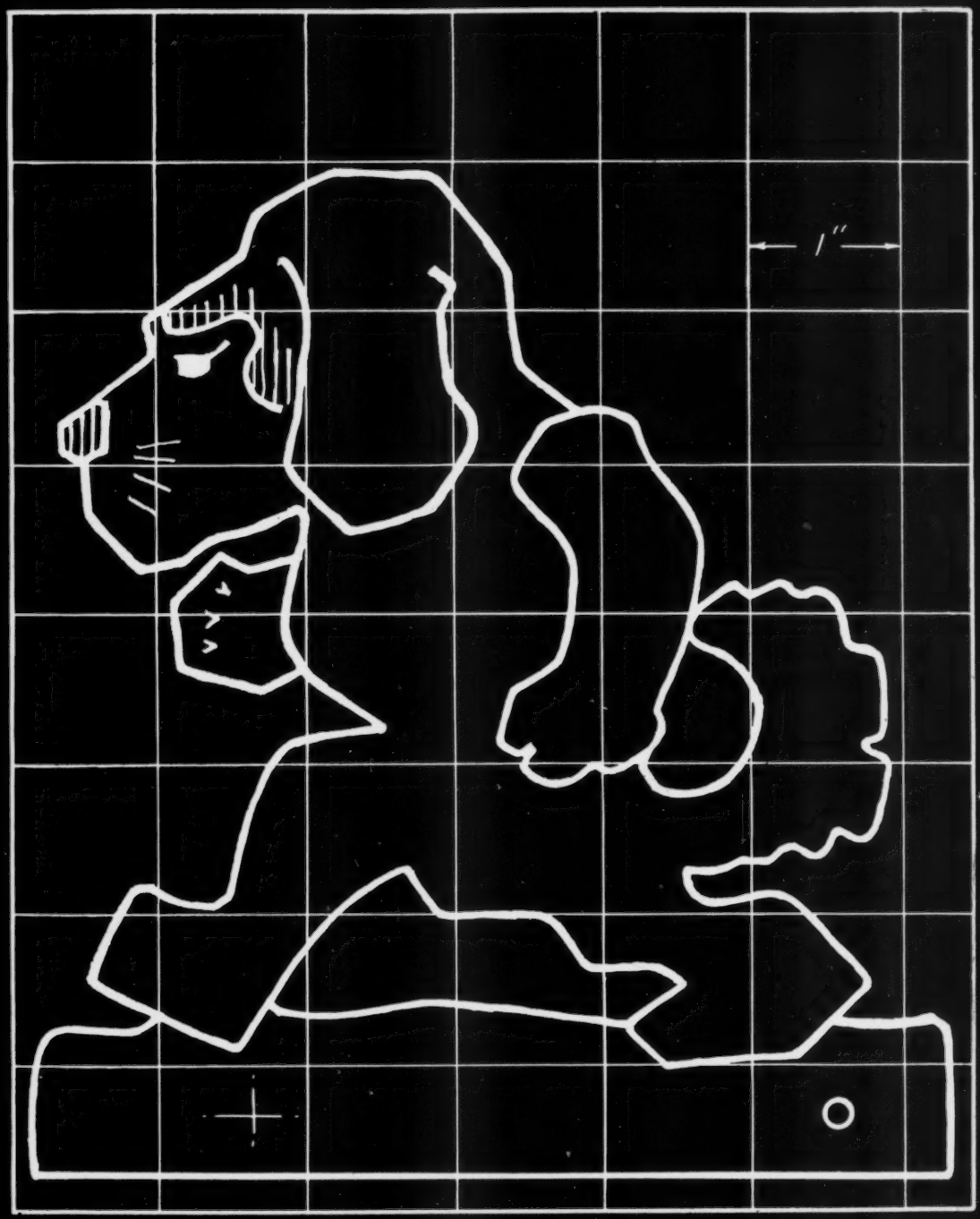
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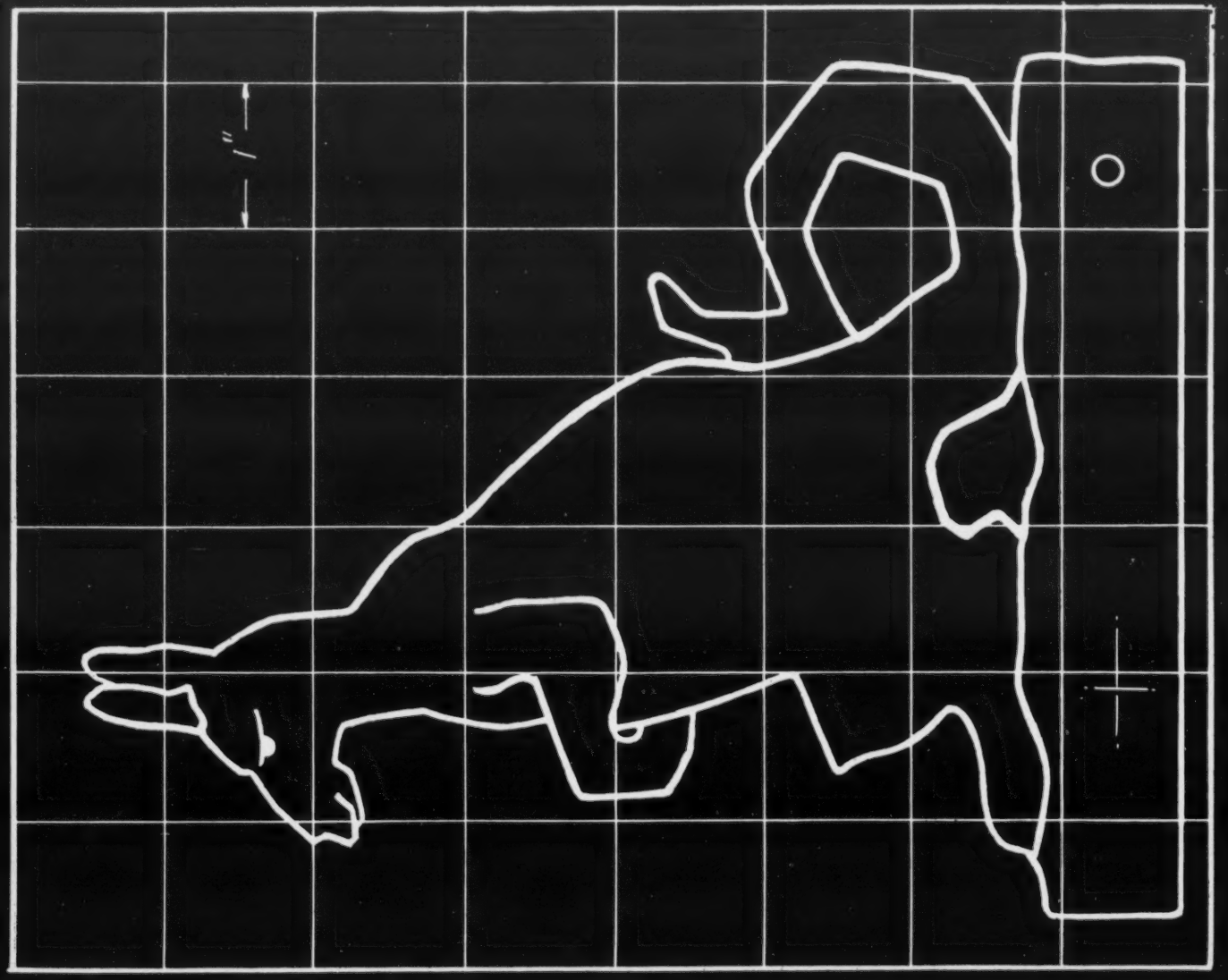
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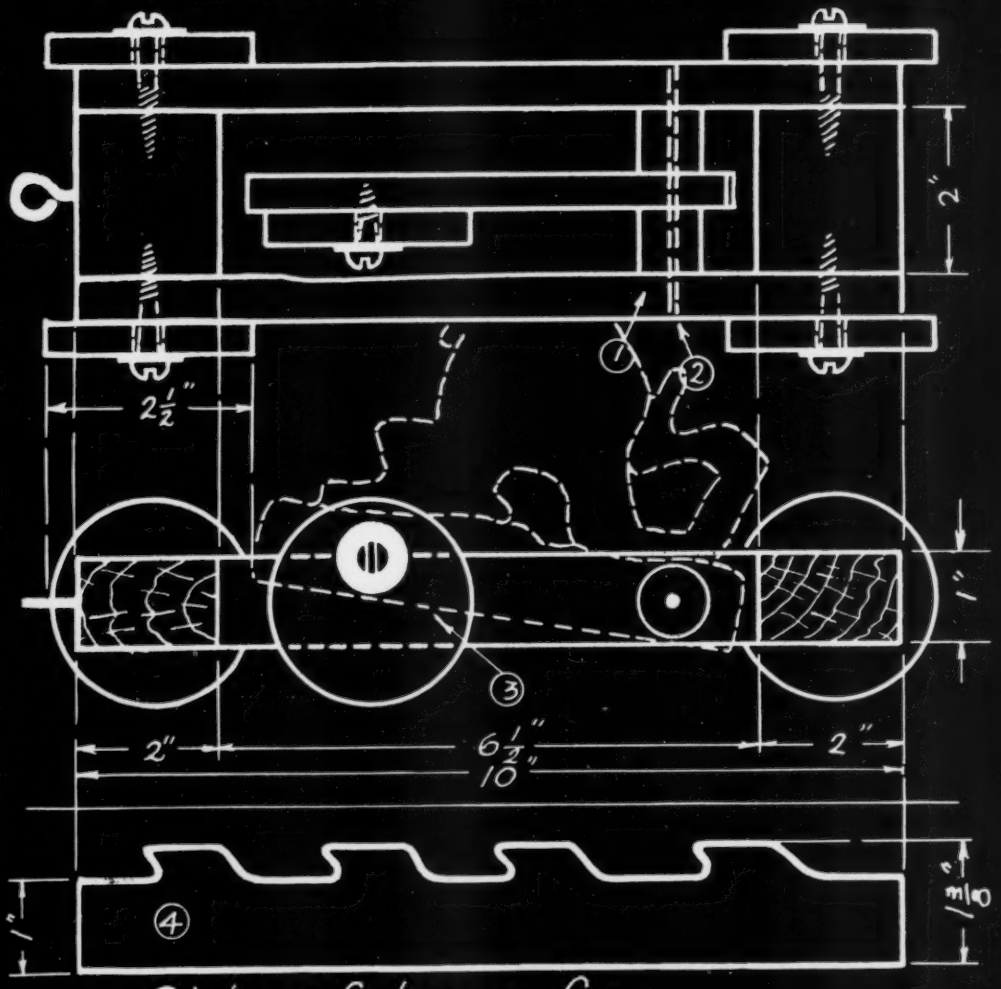
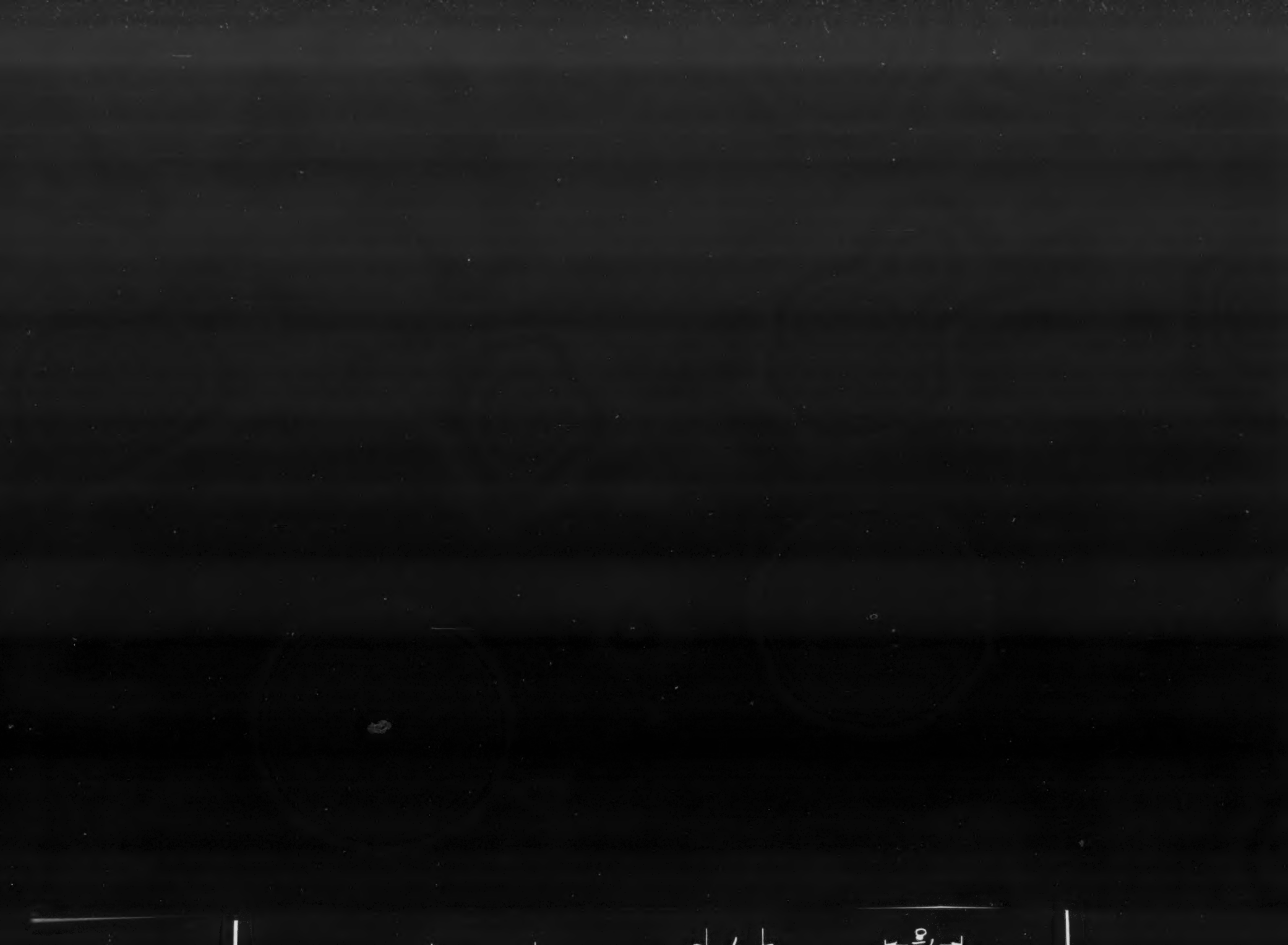
BASE

SHOWING ECCENTRIC ACTION



Side of base for
Swimming Duck.



PLAN OF TEACHER'S WORK

Student	Problem	Action Taken
1. Jenny and group.	To pronounce a list of words.	Sent back to correct mistakes.
2. Frances.	Spelling and meaning and use.	Plans sentences at teacher's desk.
3. Return of Jenny and group.	Have corrected mistakes.	Work credited.
4. Alice.	To write a composition.	Corrects some mistakes at teacher's desk. Sent back to re-write parts.
5. Return of Frances.	Writes lesson from memory.	Teacher dictates a few words.
6. Bessie and group.	Grammar lesson.	Test at teacher's desk. Papers corrected at once.
7. Return of Alice.	Has corrected composition.	Work credited.
8. Lily and group.	Discussion of story.	Sent away for group discussion and to look up mooted points.
9. Helen.	Work with telephone book.	Teacher dictates names and occupations to individual or groups.
10. Current Event group.	Group or individual recitation and reproduction of current events.	Criticism by teacher and members of group.
11. Return of Helen.	Has corrected her own work at teacher's desk, from correct list.	Looked at and corrected by teacher and pupil. Work credited.

write from memory as many of the words as she can. With a little practice it is surprising how many words a pupil will remember. It is not at all unusual for a pupil to write from memory 45 words from a list of 50 words. Then the teacher after glancing at this list need not take the class time but dictates only the five remaining words.

More dovetailing is necessary to save time.

Alice is not yet ready with her corrected composition, so while the teacher is waiting for her to return, she consults her list and finds that Bessie is ready with a grammar lesson. Five or six other girls are also ready with the same lesson. The teacher questions this group, giving a two-minute written test at her desk. papers are exchanged and corrected by the pupils, the teacher keeping a watchful eye on all the work. The marks are recorded and credit given.

Alice now brings to the desk her corrected composition. The teacher glances at the re-written portions, credits Alice and calls to her desk Lily who has read a story. Miss Gray announces that any other pupil who is ready with the same story may come to the desk. If there are seven or eight pupils ready, so much the better. There can then be group discussion. Points that were hazy to the pupil reading the story alone, may be made clear and beauties of plot and structure may be brought out. Oral reproduction to a group of selected parts of the story makes for easy unaffected self-expression on the part of the student.

If a question can be answered by no one in a group the teacher may refer the students to certain portions of the story and quiet group discussion in a corner of the room may be encouraged before the students' return to the teacher with their answers to her questions.

The Dalton plan of education does not stress the socialized recitation but this handling of the work overcomes that defect, if defect it is. The teacher has now worked with eight or more students in the time it would take to work with one, and all eight have been benefitted to a greater degree than would have been the case had they been called individually to the teacher's desk.

The next name on Miss Gray's list is that of Helen who has attended a bulletined group conference on the use of the telephone book and whose next spelling lesson, therefore, is one in which she must use the telephone book in studying names of trades, and well-known business houses.

While Helen is correcting her own work at the teacher's desk by referring to a correct list all girls who have Current Event assignments to reproduce are called for. Naturally the number varies. They are told to be ready to criticize the oral work of the one who is reproducing, each member of the group being instructed to look for specified aspects of the work—the posture, the voice, the diction, the grammar, the accuracy of the report of the speaker.

After each reproduction of a Current Event, group discussion is encouraged and the speakers receive credit. Helen's work with the telephone book is glanced over and her mark is recorded.

Instance after instance could be added to the above to show how, under the Dalton Plan, it is possible so to regulate one's work that the greatest number of students may be served in the shortest time but enough has been said to prove that it is merely a matter of:

1. Right planning on the part of the teacher.

2. Insisting that pupils come to her desk fully prepared.

3. Suggesting that pupils decide definitely for themselves just what they *do not understand,* and put this in the fewest and clearest words.

4. Starting Pupil A on her problems by hearing her work and showing her how to make her own corrections, meanwhile calling to the desk the next pupil or group—Group B—and dovetailing B's recitation between hearing A's work and looking at the final corrections made by A herself.

5. In short fulfilling the function of a real teacher —not merely being an imparter of information but "arousing in the minds of the pupils those intellectual *activities* by which knowledge is acquired."

DR. BURGESS PASSES

Theodore C. Burgess, for twenty years president of Bradley Polytechnic Institute, died suddenly at his home in Peoria, Ill., on February 26th.

Dr. Burgess came to Peoria at the time the Institute was opened 28 years ago, and was one of the three original members of the faculty. He was a graduate of the University of Chicago. Under his leadership, the institution grew from a school of two buildings and 500 students, to a group of fifteen fine buildings and more than 2,000 students.

Graphic Aids in the Analysis of Auto Mechanics for Teaching

Clyde A. Bowman, Director School of Industrial Arts, The Stout Institute, and H. F. Goode, Department of Auto Mechanics and Electrical Work

AUTO mechanics as a school course has wide use as a vocational subject and also as an avocational subject. The teacher's constant problem, whether it is being taught on a vocational basis or on an avocational basis, is one of selection from a rather large and confusing total.

Numerous logical arrangements of auto mechanics are available. Manufacturers make some divisions of the automobile for convenience in the sale of spare parts or accessories. A number of logical arrangements are possible of the auto mechanics content based on the location or operation of the various parts of the automobile. As is always the case, the choice of arrangement by the teacher when recording the analysis of the auto mechanics trade is based on ease and convenience of use in selecting portions from the total when teaching particular classes. In the initial work of graphically recording an analysis of auto mechanics to assist the teacher, the decision must be made at the outset as to whether the content of the course is to be in the field of maintenance and repair or operation. Many classifications in the graphic analysis would be the same in either case but there would, however, be some distinctions. In the present instance the instruction which is to be graphically aided is in the field of maintenance and repair.

Having made the initial designation of the field of work to be represented, the next classification is *kinds of shops.* The first outstanding division is that of the small garage including the garage of the car owner where some repair work is handled and the large garage and the specialized shops. In the small garage the worker is usually the general repair man. In the large garage, factory branch or special service shop such as battery, tire, radiator, etc., the worker is rapidly becoming a specialist. Some of the special assignments of work as indicated by present trends are listed under the heading of *specialists.* These classifications are constantly changing and in some instances have modifications peculiar to local communities. The teacher of auto mechanics will, of course, familiarize himself with the usual divisions in the community in which he is teaching. These classifications are of significance in the selection of parts of the total in auto mechanics for the purpose of planning and teaching unit courses. For extension students, either evening or slack season, the division of auto mechanics work into specialized occupations must be recognized by the teacher and by the student.

With the initial graphic representation of the various occupational situations as they exist today the analysis then moves into a consideration of the trade content. Classifications down to *major divisions of automobile* are virtually representative of occupational situations. Following the classification *major divisions of automobile,* the classifications are more specifically in the job of the auto mechanic.

Under *major divisions of automobile* various selections of terminology may be made. If the initial division is as indicated in the charts, namely, *mechanical* and *electrical,* this simplifies further work. The subdivisions under *mechanical,* namely, *body, running gear,* and *engine,* are selected for their convenience in instructional use. The chart this far is found at the top of Figures 1, 2, and 3. Figure 1 gives a detailed analysis of *running gear;* Figure 2 a detailed analysis of *engine;* Figure 3 an analysis of *electrical.* In each case the particular part of the automobile analyzed is related to the total field. Figure 4 is a reproduction of the lower part of Figure 3, illustrating a method of entering and tallying a sample or typical unit course. Figures 1, 2, and 3 are left blank in the lower portions, to make possible the entry of any unit courses planned.

In carrying on instruction in auto mechanics in the maintenance and repair field the learner is familiarized with parts and their types and kinds. He must then be taught the functions of these parts and the relationships of these parts one to the other. Based on these functions and relationships the common operations and jobs in maintenance and repair are taught. This information on functions, relationships, and jobs virtually constitutes the meat which is built up around the skeleton form in Figures 1, 2, and 3. Each part is carried through classifications of types and kinds down to and including basic operations which are performed in the common maintenance and repair jobs on this part. The basic operations are classified, indicating whether they are performed only in repair work, performed only in maintenance work, or in both. It is very likely that in the actual work in the shop it will not be possible for the pupil to work on all of the types of all of the kinds of a given portion of auto mechanics such as springs, for instance. In connection with those types and kinds of springs which he does not work on he can be given instruction on them or can be directed where to find such information. This instruction can center around the experience he has had in the shop on some of the types and kinds and can use this experience as a core in studying the other kinds and types on which no shop experience was available.

In shop courses there are three bases, some one of which is used in the selection of the content. First, there is the try-out course which is usually the initial course taken by the student. Frequently this is the shop course taken in the junior high school, although not

necessarily confined to this period in the individual's education. Second, there is the course taken by the advanced pupil following a tryout course or taken by the individual in a part-time trade extension class or an evening industrial class. In this instance, the content of the course is divided into units, the selection being made on the basis of need on the part of the pupil and the usefulness when once in the possession of the pupil. The third basis of selection is that which is occasionally found in unit trade schools where the learner is carried through all the divisions of the trade. Due to the fact that auto mechanics is built up of work from a number of trades such as those of the machinist, the blacksmith, the sheet metal worker, and the electrician, it does not lend itself to try-out courses. Any try-out work which

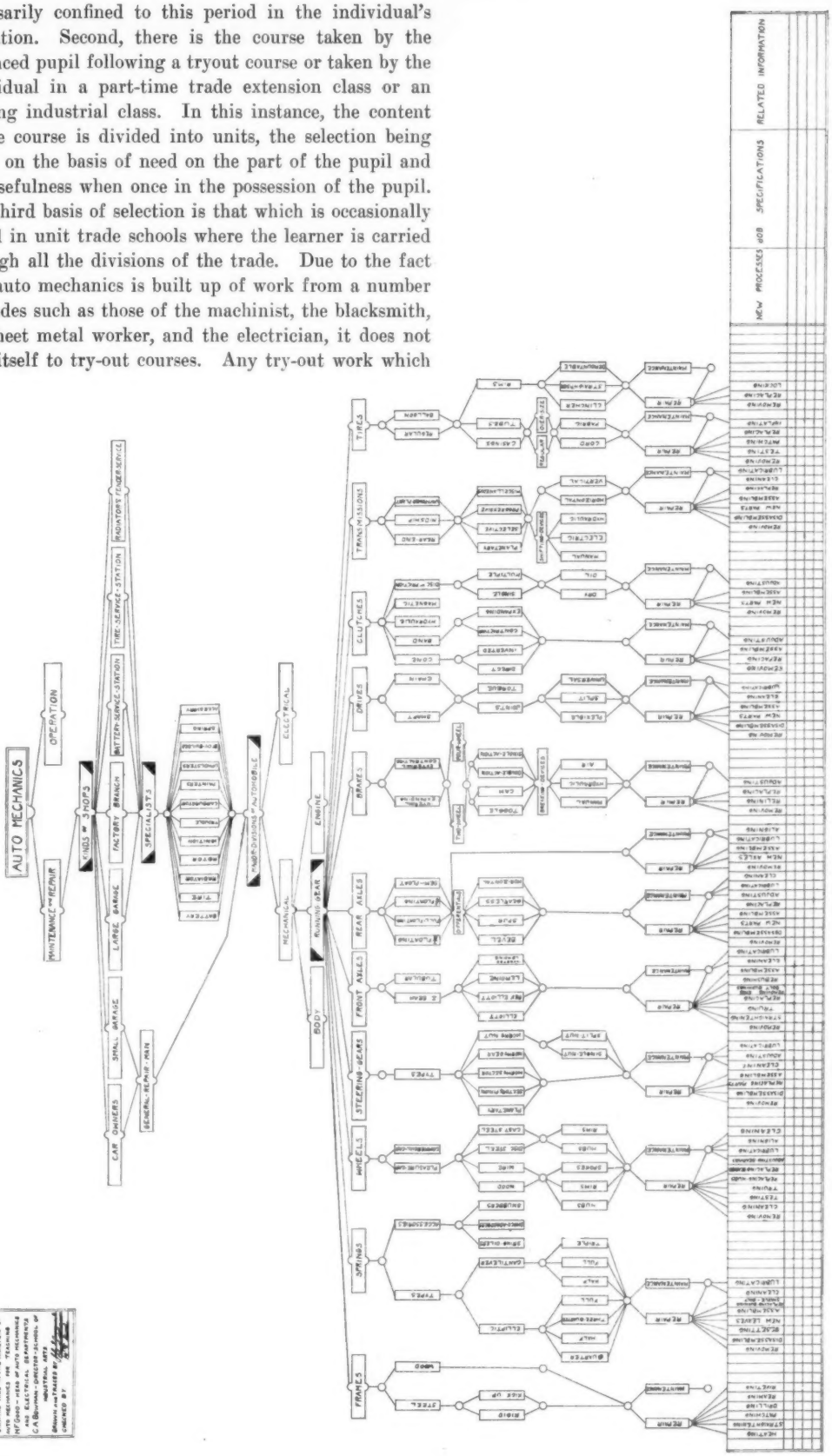


FIGURE 1.

THE STOUT INSTITUTE
MENOMONIE WISCONSIN

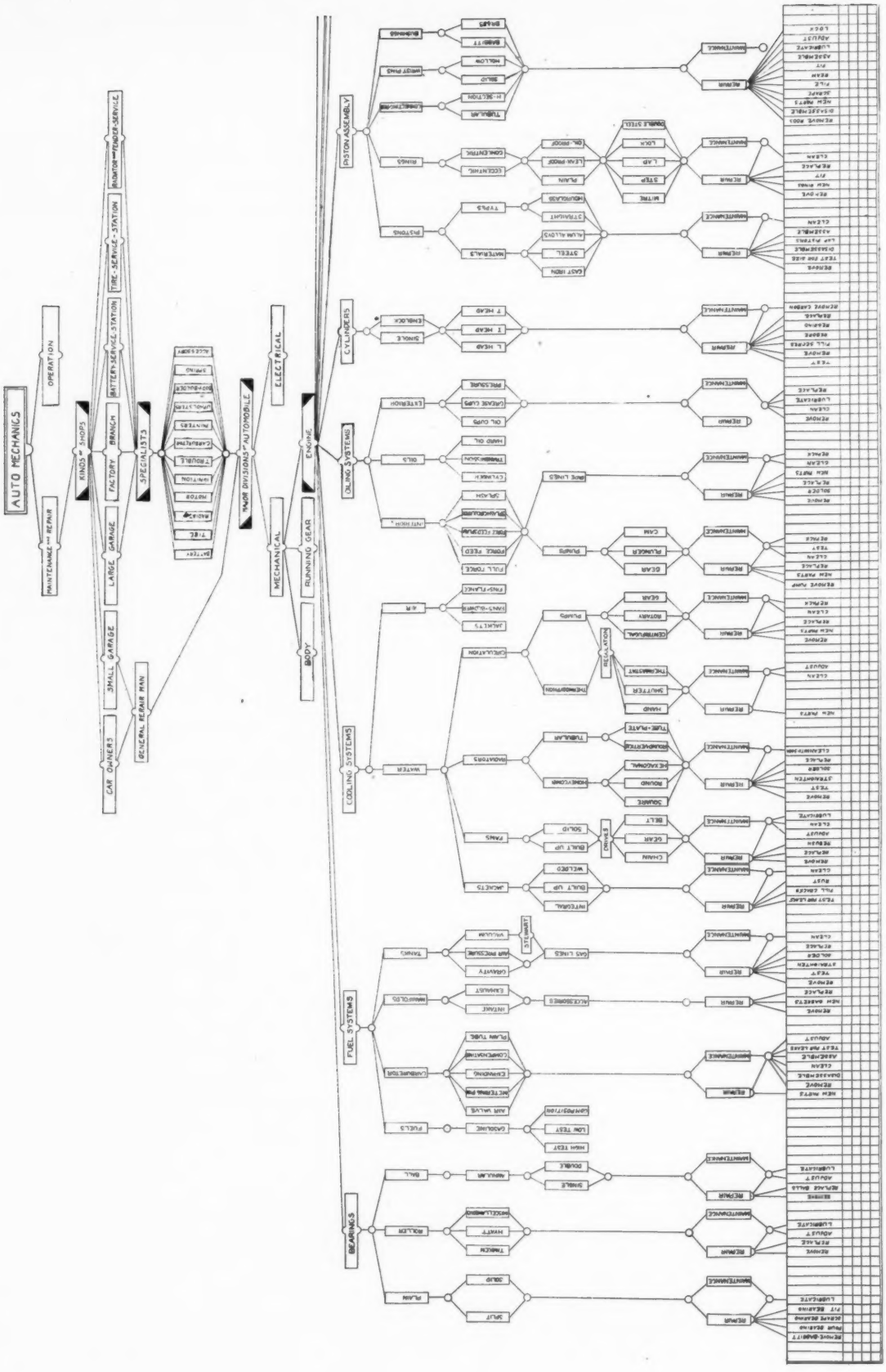

AUTO MECHANICS
OPERATION
MAINTENANCE AND REPAIR
KINDS OF SHOPS
LARGE GARAGE
SMALL GARAGE
CAR OWNERS
FACTORY BRANCH
BATTERY SERVICE STATION
TIRE SERVICE STATION
FRONT END SERVICE
GENERAL REPAIR MAN
SPECIALISTS
MAJOR DIVISIONS OF AUTOMOBILE
ELECTRICAL
MECHANICAL
ENGINE
RUNNING GEAR
BODY
PISTON ASSEMBLY
CYLINDERS
OILING SYSTEMS
COOLING SYSTEMS
FUEL SYSTEMS
BEARINGS
REPAIR
MAINTENANCE

FIGURE 2.

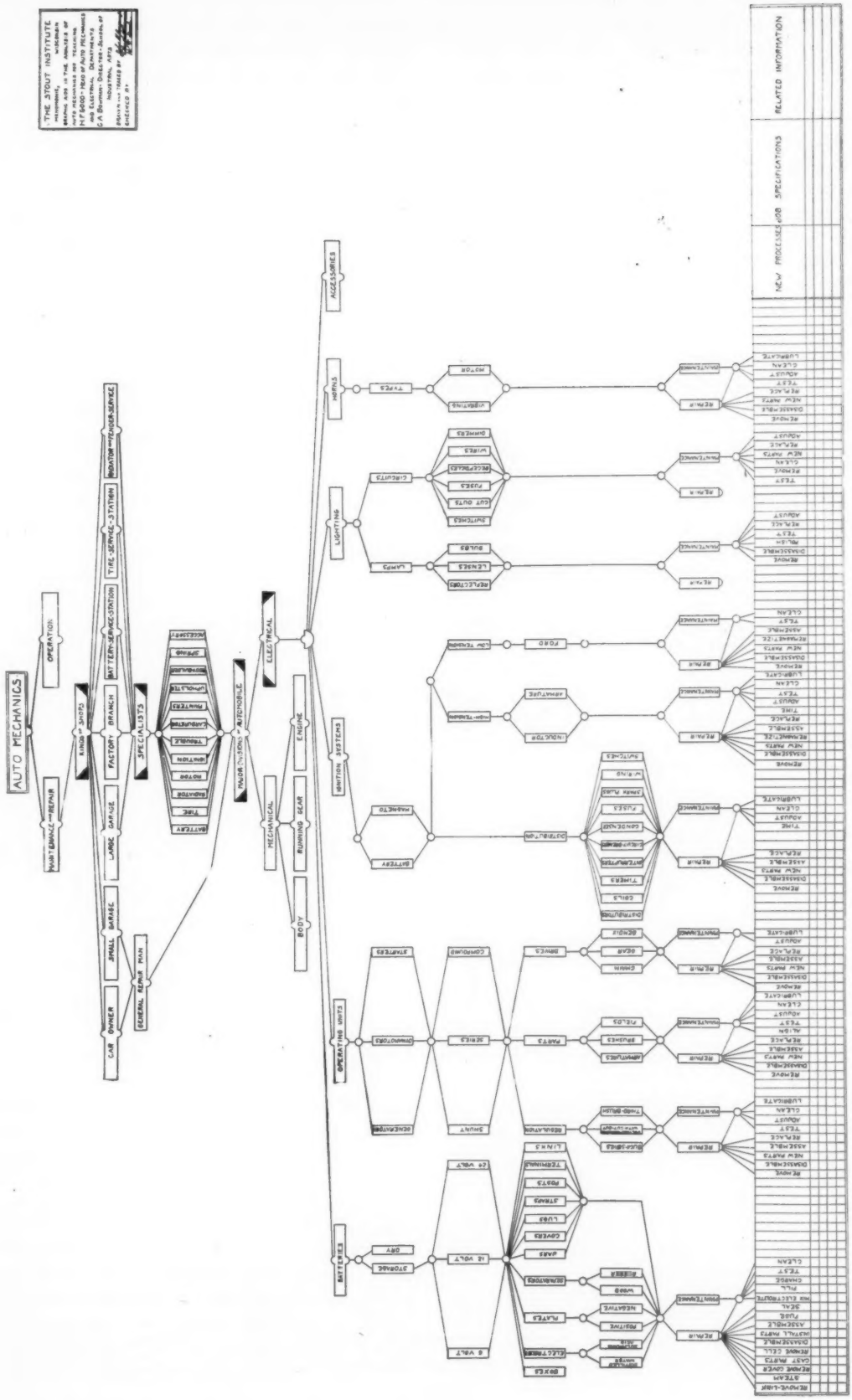

AUTO MECHANICS
OPERATION
MAINTENANCE—REPAIR
KINDS of SHOPS
FACTORY
BRANCH
SPECIALISTS
CAR OWNER
GENERAL REPAIR MAN
SMALL
GARAGE
ARC
BATTERY
TIRE
RADIATOR
ROTOR
IGNITION
TRANSMISSION
SPRING
MUFFLER
MOTOR
BATTERY-SERVICE-STATION
TIRE-SERVICE-STATION
RADIATOR-FENDER-SERVICE
AUTOMOBILE
ELECTRICAL
MECHANICAL
ENGINE
RUNNING GEAR
BODY
ACCESSORIES
HORNS
LIGHTING
IGNITION SYSTEMS
OPERATING UNITS
BATTERIES
NEW PROCESSES
JOB SPECIFICATIONS
RELATED INFORMATION

FIGURE 8.

is necessary in connection with auto mechanics is probably taken care of in other initial courses such as those mentioned. In teaching auto mechanics, therefore, most of the instruction will be through unit courses of one type or other.

In selecting unit courses the units may be taken on the basis of any logical division of trade content or may be selected according to the trends in industry now. By this second basis is meant the dividing of the trade content into portions in a manner similar to the division of the trade in assigning portions of the total to specialized workers. The reader will note that in the classification, *kinds of shops,* in the upper part of the chart there is indicated a certain trend in the specializing of workers in auto mechanics. If unit courses in auto mechanics are selected following the trends in specialization, it will enable the student to use that which he gains in his auto mechanics course as he enters the occupation. It will facilitate a quick orientation in the occupation. As the student is carried through a succession of these unit courses he is approaching a breadth of training that will fit him for the work of an all-round auto mechanic. By the selection of unit courses on this basis it means that should the individual at any time be forced to withdraw, he can immediately use the portions of the trade which he has covered. This progress being also in the direction of an all-round training enables the student to maintain continuity in his preparation for work as an auto mechanic if forced to take it intermittently. The unit course used here as an illustration is selected on the occupational basis. It is a unit course containing a logical division of work from the total in auto mechanics and it is also the work commonly assigned to the battery service man.

Figure 4 is a suggestive arrangement of detailed material for planning a unit course in one portion of Figure 3, namely "batteries—storage." There is indicated, first, the classification by volt capacity. The next level indicates parts of the batteries and types, all shown in their relationships. The classification, *repair* and *maintenance,* is based on the distinction of work on a battery which is out of service and work on a battery which is in service and requires the ordinary amount of attention. The classifications of things done under repair and maintenance are sorted according to those headings. The checking figures below indicate the basic things done in the jobs listed at the right under the heading *job specifications.* These checking figures also indicate the order in which these basic things are performed.

Beginning at the new process column material is arranged to be of assistance in making job sheets and in routing a pupil through the work of the unit course. If material is desired for publication in courses of study, that part of Figure 4 beginning with and including new processes and reading to the right could be so used. The material at the left is the teacher's check of his analysis of a part of the trade.

The entries in the new process column indicate by figure (referring to the checking figures at the left) the new processes involved as the work proceeds. The job specifications are listed by steps in sufficient detail for the procedure portion of a job sheet. The tool list is in sufficient detail for that portion of the job sheet calling for tools. The equipment column is so arranged. The material column gives the information needed for the job sheet under the heading *material.* The related information is condensed and indicates through specifi-

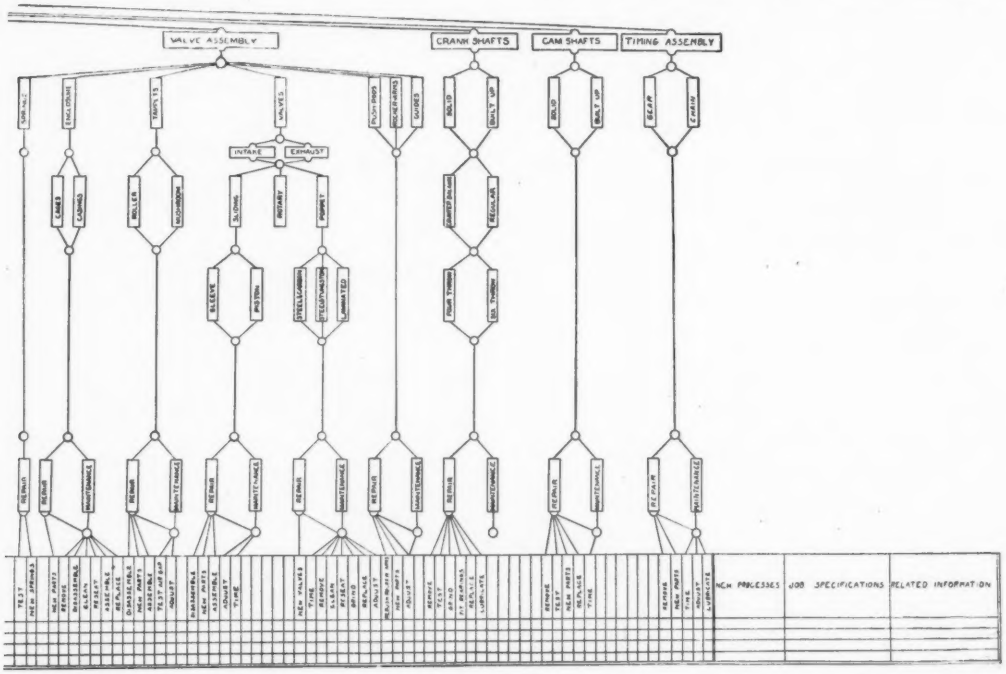


FIGURE 4.

cation entries under the heading *technical and occupational* and through classified references under the heading *references* the material that is needed to be known in performing the things to be done in the jobs specified in the job specification column. Numbers listed in the reference column refer to pages in the books listed at the top.

SAMPLE JOB SHEET

Block—Storage Batteries
Unit
Job Sheet No.

A. JOB SPECIFICATIONS: To mix electrolyte.

B. JOB APPLICATION: The electrolyte used in a storage battery must be prepared some time before using, as the chemical reactions which take place between the sulphuric acid and water heat the mixture to a high temperature. This temperature must be reduced before the electrolyte can be used. The electrolyte is the active agent in a storage battery and the source of energy represented by the current taken from the battery is the chemical transformation which occurs within the electrolyte. In installing new plates, or separators, it is usually necessary to replace the electrolyte, due to the accumulation of refuse from the broken down plates and separators.

C. (a) TOOLS AND APPARATUS
1. Hydrometer.
2. Stone jar.
3. Glass stirring rod.

(b) MATERIALS
1. C. P. (commercially pure) sulphuric acid.
2. Distilled water.

D. PROCEDURE
1. Clean stone jar.
2. Determine amount of electrolyte wanted.
3. Pour distilled water into jar first.
4. Add sulphuric acid to the distilled water in about the proportion of one part of acid to four parts of water. The acid should be added very slowly and the mixture stirred continuously while the acid is added. (The specific gravity of c. p. sulphuric acid is about 1.83, while the specific gravity of water is 1.00. When the final mixture is completed it should have a specific gravity of 1.300.) If after cooling, the mixture does not have the correct specific gravity, add water or acid slowly, depending on which is needed, until the correct specific gravity is obtained.

E. QUESTIONS
(1) Why should a stone jar be used for mixing the electrolyte?
(2) Why is distilled water used?
(3) Why should the acid be poured into the water instead of pouring the water into the acid?
(4) Why does the mixture heat?
(5) What is the chemical reaction which takes place when the acid and water are mixed?
(6) What is the significance of having a specific gravity of 1.300 in the final mixture?
(See references.)

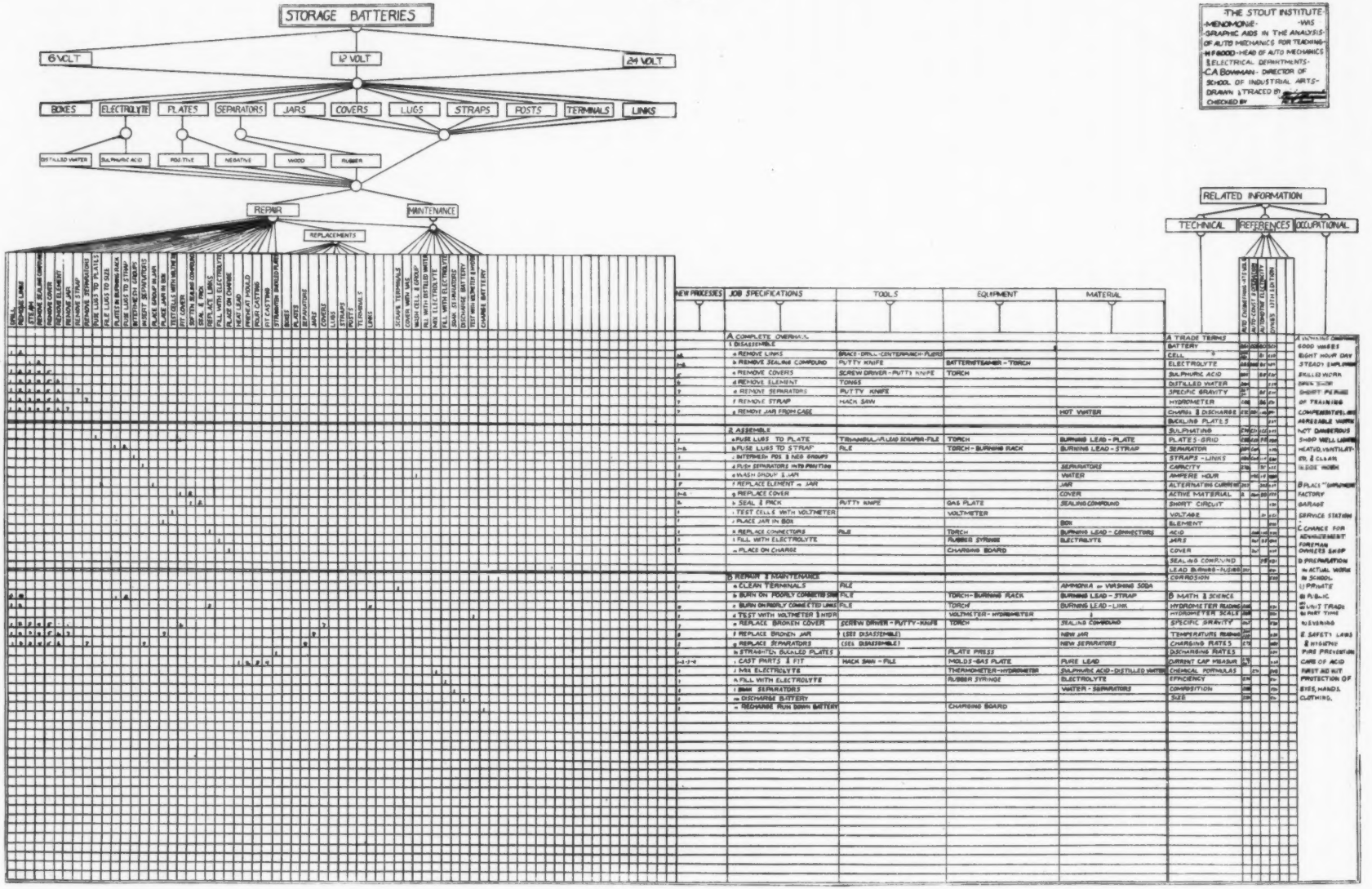
The form of job sheets suggested may be modified in arrangement to suit local conditions. It may be noted that the job sheet for an auto mechanics job in maintenance or repair usually carries in the little explanatory paragraph immediately following the job specifications a statement of symptoms or diagnosis. In virtually all cases where there is need for an auto mechanics job in maintenance or repair, a certain situation exists which gives rise to the need of doing the job. The recognition of this situation probably can be called diagnosis. As such it is a statement of when and why a job is performed and indicates the situation which usually should exist before the job is necessary. Where the classification of the job is construction rather than maintenance or repair, the orientation paragraph indicates application through need and use of the product rather than diagnosis.

Objection is frequently made to the use of job sheets in instruction on the grounds that it tends to restrict the opportunity of the pupil to think through his own work. It is impossible to write a job sheet for each job that will come up in auto mechanics. There is such a breadth of possibility, so many kinds of accidents, and so many kinds of difficulties to be met, that it is not advisable to attempt to foresee all situations in terms of job sheets. Every situation in auto mechanics, however, necessitating maintenance and repair, is a combination of basic operations or basic jobs. The teacher in auto mechanics in the selecting of jobs for putting in job sheet form should, therefore, select jobs which occur very frequently, which have plenty of content in them, which do not involve a prohibitive expense, and which when possible are jobs that are least likely to be learned by the individual outside of school. If such selection is made a series of jobs is available in job sheet form which will constitute the basic instruction.

After the learner has been taken through a series of basic jobs in auto mechanics, working from job sheets, he has had opportunity to learn a definite procedure in analyzing a job. His instruction will not be complete until the teacher has required him to plan some jobs of his own. It is probable that some instruction will be necessary in connection with the job sheet and the manner of making it. The learner's attention will be called to the various outstanding divisions of content in the job sheet. His attention will be directed to the job sheet this time from the viewpoint of making a job sheet rather than from the viewpoint of using the job sheet. He will then know a specific method to be used in planning a job and should be required to make some job sheets himself. The final step is to impress the learner with the fact that the job sheet in the form which he gets it is a record on paper to show the mental work in the order in which it should be performed as he works as a skilled mechanic.

There are, of course, certain extremes to be avoided in instruction in any kind of work. The teacher of auto mechanics who attempts to put across the information and instruction necessary by simply talking it to his pupils will find that he is able to put across but a very small part of what should be taught. In the other extreme the job sheet is not to be regarded as eliminating the necessity of teaching. Use of the job sheet intelligently makes it possible for the teacher and the pupil to focus their attention on those parts of the job where teaching is necessary. The job sheet furnishes a means of conveying to the pupil that which is probably conveyed better through graphic means than by word of mouth. It gives the learner some means of orienting and locating the demonstrations in the proper order of operations in a job. The job sheet is not to be regarded as a substitute for teaching nor for experience nor for judgment. It is an instructional aid and is to be used

FIGURE 5.



INDUSTRIAL-ARTS MAGAZINE

as a device to aid the learner in acquiring orderly experience in the many basic operations of work in the total field of auto mechanics.

It is probable that the learner will be acquiring experience in auto mechanics in school and out. This, of course, is very much the case in the situation of the extension student in the part-time school or the extension student in the evening school. It is also the case frequently where the individual is taking auto mechanics in the senior high school. The charts are of value in giving the learner an oportunity to keep a constant up-to-date inventory of his experiences in auto mechanics. By checking his experience in the total fields indicated in Figures 1, 2, and 3 he can keep accurate record of his progress in participation in the total field. This checking can be by means of circles, check marks, or any other graphic device. In classifying students at the beginning of a course, the charts will be of value in listing and designating previous experience of the individuals.

Safety Sign Suggestions

Lawrence N. Cilley, Gorham Normal School, Gorham, Me.

In these days of great industrial strides and also when so many schools teach the use of having power machines, there is a need of words of warning of the dangers involved in pupils or inexperienced persons using these machines. Instructors should require students to have their parents send written permission to use even the less dangerous power machines. Careful instruction must be given and demonstrations made of the various jobs to be done on the various machines. Only after careful observation by the instructor, should permission be given to students to operate the more dangerous machines.

One must have a good working knowledge of a machine, its possibilities and limitations, learn the sound when running correctly and be keenly alert for any danger sounds, before he is qualified to operate a machine.

With the above in mind, I have made up a set of sheets to be printed on heavy paper, shellacked to keep clean and posted in plain sight near its machine. In some cases a frame may be necessary to make some support for the card.

In explanation of some of the statements, I would say that:

One must keep his mind on his work to save time, mistakes, increase the quality and quantity of work, and be keenly alert for the unexpected.

There are many safety devices that come with the machines and many more can be made in the shop to minimize the chances for accidents.

There is a minimum length for stock to be used on many machines.

Many accidents occur by taking too heavy cuts on small stock; also by using dull knives and saws.

Safety Signs to be Posted Near the Machines

(Cards 12" x 18")

JOINTER:
- DANGEROUS MACHINE
- Keep GUARD in PLACE
- See to DEPTH of Cut
- MINIMUM LENGTH 12"
- Use SAFETY DEVICES
- Keep MIND on WORK

CIRCULAR SAW:
- DANGEROUS MACHINE
  - Before starting:
- ADJUST HEIGHT of SAW
- BEWARE of BINDING STOCK
- CLAMP FENCE SECURELY
- USE SAFETY DEVICES
- KEEP MIND on WORK

PLANER:
- MINIMUM LENGTH 15"
- BEWARE of HEAVY CUTS
- LISTEN to SOUND of MACHINE
- AVOID PASSING STOCK over HEAD
- KEEP PIECES OF STOCK BEHIND EACH OTHER
- AVOID LOOKING into THROAT

BAND SAW:
- LISTEN for CLICK of BREAK
- SEE to HEIGHT of GUIDE
- AVOID BACKING UP of STOCK
- AVOID CROWDING of the SAW
  - On the other side of saw a sign:
- DANGER AREA on this SIDE

LATHE:
- CLAMP TAIL-STOCK SECURELY
- CLAMP TOOL-REST SECURELY
- KEEP TOOL-REST NEAR STOCK
- HOLD CHISEL FIRMLY
- AVOID RUNNING BELTS
- REPLACE PUSH ROD after USING
- USE LOW SPEED with LARGE STOCK
- USE PAPER WASHER with FACE PLATE
- KEEP MIND ON YOUR WORK

MORTISER:
- ADJUST for HEIGHT CAREFULLY
- CLAMP WORK SECURELY
- AVOID CROWDING CHISEL
- SEE to CLEARANCE of BIT

SWING SAW:
- USE STRAIGHTEST EDGE
- BEWARE of TWISTED STOCK
- USE PROPER HAND—
  - TO PULL SAW
  - TO HOLD STOCK
- AVOID CROWDING SAW
- LISTEN to SOUND of SAW

DRUM SANDER:
- AVOID HEAVY CUTS
- LISTEN to SOUND of MACHINE
- KEEP FINGERS away from DRUM

BELT SANDER:
- AVOID HEAVY PRESSURE
- ADJUST for HEIGHT CAREFULLY
- USE PUSH BOARD or FLOAT

TENONER:
- DANGEROUS MACHINE
- ADJUST CUTTER HEADS CAREFULLY
- HOLD WORK SECURELY
- AVOID CROWDING KNIVES
- LISTEN to SOUND of MACHINE
- KEEP MIND on your WORK

SINGLE SPINDLE SHAPER:
- DANGEROUS MACHINE
- ADJUST KNIVES EVENLY
- TIGHTEN KNIVES CAREFULLY
- KEEP GUARD in PLACE
- ADJUST GUIDE CAREFULLY
- HOLD WORK SECURELY
- BEWARE of CROSS-GRAINED STOCK

POWER GRINDER:
- WEAR GOGGLES to PROTECT EYES
- KEEP FINGERS AWAY from WHEEL
- KEEP REST CLOSE to WHEEL
- TRUE UP WHEEL OCCASIONALLY
- DO NOT STAND in LINE with WHEEL
- KEEP GUARD in PLACE

GENERAL SHOP SAFETY SUGGESTIONS:
- KEEP MACHINES and PARTS OILED
- USE SHARP KNIVES and SAWS
- KEEP GUARDS in PLACE
- USE SAFETY DEVICES
- AVOID HEAVY CUTS
- LISTEN to SOUND of MACHINE
- AVOID LOOSE CLOTHING
- BEWARE of BINDING and TWISTED STOCK
- KEEP FLOOR FREE of SCRAP STOCK
- AVOID TALKING WHILE USING MACHINE
- KEEP MIND on WHAT YOU ARE DOING
- CARRY RULER and PENCIL with YOU
- STUDY INDIVIDUAL MACHINE RULES

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

ELIMINATE THE "FADS"?

During the distressing cry concering the difficulty of financing the public schools, a good deal has been said about eliminating the "fads." There seems to be no possible agreement as to what constitutes the fads. It is quite clear, however, that such a demand is intended as an attack on the practical subjects such as shop work, home economics, art, etc.

The elimination of such subjects would undoubtedly reduce the expense of the schools. So would the elimination of algebra, languages, and science. In any such elimination, however, the reduction in expense would be largely measured by the number of pupils driven from the schools. This fact is not to be lost sight of in any discussion of this matter. One of the great purposes of the socalled "fads" from the very first has been to attract boys and girls into the schools, to arouse their interest in thought-provoking and skilful work, and thus to hold them more securely and more permanently in the school, and to deepen their interest in the whole school program. Any one who proposes to do away with the "fads" of industrial arts, home economics, art, etc., is, perhaps unwittingly, proposing to force from our schools the vast number of boys and girls who have in these recent years been attracted into the schools, been made happy in their school work, and greatly benefitted by their experience in the school shops, laboratories, and studios.

If this wholesale withdrawal of students from the school should not occur after the elimination of the so-called "fads," then the anticipated reduction in the total expense certainly would not materialize. There would be no reduction in the number of teachers, no decrease in the number of classrooms, no change in the library, gymnasium, and laboratory facilities, and no decrease in the general overhead expenses. The one item of saving would be the shop equipment. While this is a considerable item, it is relatively unimportant when the welfare and future efficiency of our boys and girls are considered.

Furthermore, investigation has shown that the per capita cost of shop instruction is relatively low compared with that of some of the time honored subjects of the curriculum, such as Latin and Greek.

If there are useless fads in the schools, let's point them out specifically, evaluate their importance or lack of it, and eliminate them, not wholly on the grounds of expense, but on the worthier charge of ineffectiveness as educational instruments. Let's determine the future of shop courses on the same basis on which other courses rest for their maintenance and defense. If they are found to make a distinct and necessary contribution to the welfare, happiness, and future usefulness of boys and girls, then the item of the cost of equipment will, by common consent, be borne by the people whose sons and daughters are to reap the profit.

WHO'S RUNNING THIS INDUSTRIAL EDUCATION BUSINESS, ANYHOW?

One of the difficulties that face the practical forms of education is the same difficulty that faces all other human enterprises, namely, the inability of those engaged in an enterprise to see their work *in relation to other fields and activities.* Not only are a great many people unable to see their work in relation to other different lines, but they often find it impossible to see their local work in relation to the same kind of work, on a larger scale or in a wider territory.

It is wholly inaccurate to speak of "a system" of industrial, vocational, or practical education. There is no unified system. The work is made up largely of individual attempts in widely scattered centers with no unifying principle. The work is suffering from inadequate leadership. The type of leadership thus far essayed in this field has far too often been a sort of professional dictatorship. There are a few vociferous speakers and prolific writers in this country who wouldn't know a vocational shop from a Victoria Cross, who never soiled their "Ph.D.," hands in any sort of a shop, and yet who undertake to dominate every movement, dictate every utterance, and censor or condemn every statement or proposal not made by themselves.

The sooner the school administrators, and the men and women of combined shop-and-school training think their problem of practical education through, set up sane and attainable objectives, and undertake a consistent movement to put their formulated plans into operation without the dictation of "easy chair" theorists, the sooner will they bring about a system of training and education worthy of the name.

WHY CONDEMN INDUSTRIAL ARTS WORK?

A few so-called leaders in vocational education are stupidly trying to further the cause of vocational education by condemning the various kinds of practical work designed for general educational purposes. The subject of industrial arts has come in for rather severe criticism.

This Magazine yields to no one in its zeal for the right kind of shop work for general educational purposes, and in its anxiety lest too great formalism may continue to harm the industrial arts work. But when it comes to condemning the work and trying to make capital for vocational education out of some minor defects of industrial arts courses, we enter our hearty protest.

If anyone does not know that manual training, manual arts, industrial arts, and similar work were the forerunners of vocational education, clearing its way and fighting its battles, it is about time such one be informed. For many years, these courses were the only courses anywhere that resembled vocational education. The fact that they are not strictly vocational but are intended as essential parts of a general education does not lessen their value and importance in the least.

There is a greater need right now than ever before for thorough-going, sanely conducted, well planned shop courses with a rich and significant industrial content. Attention to proper courses in industrial arts for the multitude need not in any way interfere with adequate vocational training for the comparatively few.

Give us more and better industrial arts work and a sufficient time allowance in which to do it properly.

A SUPERVISOR'S CONFESSION[1]

Bonnie E. Snow

I am a Supervisor of Art. For twenty years I have labored in the vineyard, rendering the best service of which I am capable, and hoping through my work with the children, to elevate the standards of beauty in my community. The methods I have followed have been sanctioned by the Art Schools and Academies, by the leading supervisors and the art authorities in my particular field. I have kept up with the times, supplementing my years of Art training with sessions at summer school where I have received the best of instruction and have mingled with others of my profession. I have traveled in Europe. I am familiar with the galleries. I have painted with Snell in Brittany, and studied design with Ross at Harvard. I am the Art authority in my home town.

Yet—I am dissatisfied with myself and with my work. The town in which I live is a manufacturing center. There are mills and factories which provide the means of life for many modest homes. It is my particular mission to carry the gospel of beauty into these lives and these homes. I have sought to do this by opening the eyes of the children to the beauties of nature; by interpreting as best I might the pictures of Corot and Millet; by the study of Japanese art; by lantern slide lectures on the best sculpture and architecture that the world affords. I am conscious that I have failed to influence, in any appreciable degree, the work or the lives of these people.

What is the matter? The condition which I so keenly feel is experienced by others with whom I talk. Something is wrong with our methods of teaching Art. For twenty years I have begun in the fall with the painting and drawing of flowers. In October we have painted landscapes. At Christmas time, urged by the spirit of the season and the joy of the children, we have made a few objects of use and beauty. In January we have made calendars. In February we have studied perspective. Then came March and April with pussy willows and dandelions, with tulips and daffodils. In May and June we stenciled and block printed, and thus the cycle of the year was told. At exhibition time the work of the children is displayed. The children are happy, the grade teacher feels rewarded, the principal shows visitors about, pointing to the "Art work" with pardonable pride, and the supervisor beams. But if she is a thinking woman, her beam is short lived! She reflects that the children who have painted the clover blossom and the landscapes will soon be citizens of the community. What are the problems of the citizen? He is a home maker, a business man, a manufacturer, a tradesman, a laborer. What has the Art training of the schools done for him? In making my course of study have I considered the citizen and his needs? I have not! I have never asked myself:

"How can my art course help the printer to arrange his type, the tradesman to dress his window, the carpenter to build a more beautiful house, the milliner to select harmonious colors, the dressmaker to appreciate good lines, the decorator to plan restful homes, the housekeeper to choose her rugs, the cabinet maker to know good proportions, and the citizen at large to appreciate all this?"

What shall I do with my course of study? First and foremost I believe it must be made to fit the needs of my community. The needs of my community are industrial needs, and therefore point to Industrial Art, which is based upon Design. Design is arrangement. That arrangement must be orderly and beautiful. In Design we deal with lines, shapes and colors. We work toward construction and decoration, rather than toward representation. Why then, begin with the representation of the clover blossom or the seed pod? Why not begin with the simplest forms of arrangement and the definite study of color?

I am perplexed with many problems but through my confused and anxious vision I see a dawning light. I hear a new note—the herald of a welcome change. As I work in the light, I shall see increasing light. Others are working with me. They, too, have heard the note, the call to wiser effort and a surer end. I believe in the service of Art. I know that all Art has relation to life, and I am convinced that

The life of Art is to be found in service.

INDIVIDUAL INSTRUCTION AT BUFFALO

The continuation school at Buffalo, N. Y., proceeds upon the theory that instruction must be administered on an individual basis. That is to say, the school is analogous to a clinic and the student to a patient. The Buffalo School Magazine says: "Instruction that is good for one might not be good for another. Individual differences dominate the subject matter and methods in this school more than in other schools. Each class is organized around a definite occupational objective and pupils of different ages, varying previous education, varying industrial experiences, environments, likes and dislikes, often must be grouped together. Another factor which bears upon the mode of instruction is the fact that they do not all enter or leave at the same time during the school year.

"The solution to this problem seems to be by unique instructional method—namely the unit instruction sheet. Each unit of instruction consists partly of the job that is done in the shop or laboratory, with specific directions as to how to do that job and the other half of the unit related information: that is, that which has some definite and necessary relation to the shop job. This consists of related science, mathematical problems, trade terms and safety first or hygiene."

[1]NOTE: Mr. Edwin O. Grover, who sent us the present article, writes: "I found this 'Confession' among some old papers. It was written by Miss Snow more than ten years ago—before the industrial arts movement was in motion. It is evidence of her prophetic vision, and I thought it might be interesting to many of your readers."

Bookbinding, Repair, and Rebinding

Chat. A. Picken, Detroit

(Concluded from March)

REBINDING

General Directions

Exercise 1—Books Taken Apart.

(a) Covers removed. With a sharp knife cut through the super at both joints. This frees the book from the cover. Pull off the remaining super, and all loose lining paper from the covers. The label may be removed by wetting it with a little water.

(b) Cleaning of backs. Glue and super removed from back. To remove the super from the back of the book, place the book between backing boards in a vise, allowing the back to project about one-fourth inch. Cover the back with a coat of flour, or starch paste, and let stand for a few minutes. Some books take more time than others, varying from five to twenty minutes. Two or three books may be handled at the same time. Remove the first coat, probably the paper from back of book, by pulling it off with the fingers, or scraping it off with a bonefolder. Apply another coat of paste and let stand until the super pulls off easily, allowing the heavy coat of glue to remain on the book. Apply paste to glue, letting it stand until the glue becomes softened. Then, with a bonefolder, scrape the glue from the back of the book, always scraping from the center to the outside. Remove the book from the boards.

(c) Sections cut apart. Clip the threads between the sections along the fold, cutting off one section at a time. Care should be taken to keep the sections piled in the same order as when sawed. When the sections are all cut apart, remove the loose threads. To do this, open the section at the center and pull the threads out, again stacking the sections.

(d) Sawing the inner margin.

1. When sawing the inner margin for sewing on cords, the V-shaped groove where the cords are to come should be one-eighth inch deep. Cuts from one-sixteenth to one-eighth inch deep should be made parallel to and about three-fourths inch from head and tail of the book for the "kettle stitch."

2. When sawing the inner margin for sewing on tapes, the cuts should be from one-sixteenth to one-eighth inch deep and parallel with the head and tail edges. The cuts should be on both sides of the tapes, and should be made about three-fourths inch from head and tail of book for the "kettle stitch." Thus, a book to be sewed on three tapes, should have eight draw cuts along the inner margin.

Exercise 2—Bocks Resewed

(a) "All-along" or "Straight-on." Do not fasten the thread to one of the end cords. Sew on end papers and fly leaves before sewing the first section. To do this, pass the thread through the cut for the cord to the center of the section, and sew around the cords, and out through the last hole. Lay the first section, face downward on fly leaves, and sew back in the same manner. Thread is drawn out through the last, or kettle stitch hole. Tie thread to loose end. The second section is put in place, face downward, and sewed in like manner. As the thread is drawn out through the last hole, it is passed between the two preceding sections and around the thread which has fastened them together, making a kettle or chain-like stitch. Then the thread is passed into the hole of the next section, which is to be laid on, and the process repeated. After sewing on the last end papers and fly leaves, cut the book free from the frame, allowing from one to two inches of cord to project beyond the back of the book. Trim end papers and fly leaves the same size as the book.

(b) The following methods may be used in trimming:

1. Hold the shears flat against the edge of the book when trimming the leaves down to the same size as the printed material of the book. Long or short cuts may be made according to the ability of the pupil.

2. Lay the book down on the desk, so the end papers are at the bottom. Trace around edge of book on the end paper, and use these lines as guide lines for cutting. If the cutting is to be done with a paper trimmer, the guide lines should be extended to the margins.

Exercise 3—Forwarding

(a) Gluing backs. Apply a thin coat of glue to the back of the book, and let stand until nearly dry.

(b) Rounding and backing. The back of the book is thicker than the rest, because of the threads, and should be rounded and backed after the glue has ceased to be tacky and before it has set hard.

1. *Rounding.* Place the book with the front edge toward you, and the book projecting a little over the edge of the rounding board or bench; then draw the book toward you, and when it is in this position, tap along the back of the book with a hammer. Turn the book over and repeat the process, forming a well-rounded back.

2. *Backing.* Place the book between the backing boards, so that the back of the book projects out about one-eighth inch. The book and boards should be clamped very carefully, and very tightly into the vise jaw or lying press. A well-backed book should be no thicker than the book and its covers. If the book slips ever so little, you will not get a well backed book. The backs of the sections should now be hammered out one over the other. This is done by side strokes of the hammer, from the center to the outside. Remove from backing boards and stack. Care should be taken to stack the books so nothing touches the backs and joints.

(c) *Cords frayed and pasted down.* Fray the cords out like fans and paste down on the end papers.

(d) *Canton flannel.* Stipple a thin coat of glue into the back of the book. Cut the canton flannel one-half inch less than the length, and three inches wider than the back of the book. Paste canton flannel to glued back, allowing about one and one-half inch of canton flannel to extend down on the end paper. Iron well, first with the palm of the hand, and then with a bonefolder. Paste the canton flannel down on the end papers. Care should be taken not to break down the joint.

(e) *Testing covers.* Place the book right side up in the covers to see that it fits; crowd the back well into the cover.

(f) *Hanging book in covers.* Turn the cover back carefully and apply paste to end papers, brushing the paste to the outside. Close the cover and iron well. Rub down joint with bonefolder. Turn the book over carefully and repeat.

(g) *Setting joints.* Set the joints with coppered wires, and put the book between press boards, and under weight to dry.

(h) *Putting under press.* Books should be left at least twelve hours to dry. In damp weather books sometimes take 24 hours.

4. Covers

Covers should be made so they project one-eighth inch beyond the top, bottom, and front edges. This is done by cutting the chipboard one-fourth inch wider than the length of the book, then setting the chipboard on the cover, well back in the joint, and out flush with the front edge.

REBINDING—NEW COVERS

Equipment: See "General Equipment for Book Repair and Rebinding."

Supplies: Vellum, chipboard, thread, end sheets, fly leaves, guards, tapes.

Method of Procedure:

1. Make covers to fit book according to one of the methods described under "Covers." See General Directions.
2. Make end sheets and fly leaves.
3. Sew book according to general directions, "Rebinding" Sewing.
4. Forward.
5. Put under press to dry.

Recasing

Covers and Folds in Good Condition

Equipment: Sewing frame, needle, thimble, bonefolder, vise jaw, shears, coping saw, trimmer, backing hammer, backing boards, coppered wires, press.

Supplies: Thread, cords or tapes, paste, glue, newspapers, end papers, fly leaves, canton flannel.

Method of Procedure:

1. Remove the covers from the book.
2. (a) Sewing all along.
   1. Clean off the backs.
   2. Cut the sections apart.
   3. Saw the inner margin for sewing.
   4. Resew the books on cords or tapes.
   5. Trim the top, bottom and front edges if soiled.

3. Forward.
   (a) Glue backs.
   (b) Round and back books.
   (c) Paste on end papers.
   (d) Cut and fray cords.
   (e) Paste on canton flannel.
   (f) Test covers.
   (g) Hang books in covers.
   (h) Set joints.
   (i) Put under press to dry.

Sewing in Good Condition (Covers Loose)

Care should be taken not to break down the joints.

(a) Replacing covers with end sheets.

1. Pasting on fly leaves. "Tipping-in," see General Directions.
2. Overcasting fly leaves to book proper. See General Directions.
3. Pasting on end papers. See General Directions.
4. Glue backs and paste on canton flannel.
5. Test covers in the book. See General Directions, 2-a-l-e.
6. Hang book in covers. See General Directions, 2-a-l-b.
7. Set joint with bonefolder and coppered wires. See General Directions, 2-a-l-g.
8. Putting under press to dry. See General Directions, 2-a-l-h.

(b) Replace with double stripping.

One to five same as above 1, through 5.

6. Paste double stripping to inner margins. See General Directions.
7. Set joint.
8. Put under press to dry.

Covers in Good Condition. Folds in Poor Condition

Equipment: Sewing frame, needles, thimble, bonefolders, vise jaw, shears, coping saw, trimmer, backing hammer, backing boards, coppered wires, press.

Supplies: Thread, paste, glue, newspapers, end papers, fly leaves, canton flannel.

Overcast if folds are in poor condition.

Covers are removed. See General Directions, 1-a.

1. *Books are squared*

Lay the books on the rounding board, and hammer the joints out. Square the back to make the book ready for trimming.

2. *Trimming*

Trim off about one-eighth inch of the old back. This removes all of the old super, glue, and worn out folds, leaving the book in single sheets.

3. *Gluing*

Glue the back edges of the book and set to dry.

4. *Broken up into Sections*

Break up the book into sections, having about the same number of leaves as in the original.

5. *Perforating*

Punch holes in the sections along the back margin, about one inch apart, and from one-eighth to three-sixteenths inches from the edge.

6. *Sewing.* Overcasting, with cords or tapes, or without either. See general directions, Book Repair.

7. *Trimming*

Trim the top, bottom and front edges if soiled. Not more than one-sixteenth inch edge should be removed.

8. *Forwarding*

(a) Rounding and backing—backs glued. (See General Directions, 2-a-l-a-b.)

(b) Pasting on end papers.

Fit the end papers to the book, so that the folded edge comes exactly in line with the back edge of the book. The folded edge will have to be "turned-up" to make the end paper set lightly in the joint. When this has been done perfectly, apply paste to the fly leaf, always brushing from the center to the outside margins. Care should be taken that the cloth on the fly leaf is well pasted. Lay the end paper down on the pasted surface of the fly leaf again, making sure that the fold is in exact line with the back edge of the book, and rub down well. Repeat this process on the opposite side of the book.

(c) Cords or tapes.

If the book is sewed on cords, the cords should be frayed out, and pasted to the end papers. If sewed on tapes, the tapes should be pasted flat.

(d) Canton flannel. (See General Directions, 2-a, l-d.)

(e) Testing covers. (See General Directions, 2-a, l-e.)

(f) Hang book in covers. (See General Directions, 2-a, l-f.)

(g) Setting joints. (See General Directions, 2-a, l-g.)

(h) Putting under press to dry. (See General Directions, 2-a, l-h.)

Where books are completely worn out, the covers only are turned into the stock room, and selected portions of the contents are used in binding up pamphlets for the department of special education, scrap books, etc. Obsolete books are also put to such special uses. Magazine protective covers are also made by the classes in bookbinding and repair.

Aside from the pride which the boys naturally take in putting their own (children are encouraged to bring books from home which need repair), and the books at their school, in first-class condition, the educational value of the course is incomparably superior to that of any of the courses in thin wood or cardboard construction work we have heretofore attempted for fifth grade pupils; and, in addition to the immediate monetary saving accomplished by the pupils in their work, is the enormous cumulative value of their education, at an early age, in the proper care and handling of books, whether public or privately owned. This course teaches a boy, naturally more or less destructive, to respect a book. When he has taken a book, badly dilapidated by careless handling, through all the steps heretofore outlined, there is ingrained in him an instinctive respect for the time and labor that each book which comes into his hands represents, and this instinct, inculcated by hours of effort to repair his own, or somebody else's carelessness, does make certain that he will never again do the careless, thoughtless, destructive things that boys have been doing day in and day out, year in and year out, to books.

The immense amount of special material which, while its cost is trifling, looms very large when it must be distributed and collected before and after each class, makes the work in this course quite a burden to the instructor, unless some adequate means of caring for the equipment, and systematizing its distribution, collection, and movement from room to room, is provided. Some principals, realizing this need, allow their teachers as much as thirty minutes, and the room in which the class is to be held, to lay out their supplies and prepare for the class; and fifteen minutes after the class to clean up and put away materials.

The author, having in some cases no time between classes, and finding that time taken to distribute and collect materials, where it all had to come out of a one-hour class period, was causing a great deal of confusion, and resulting in very little accomplishment, designed and built the cabinet, photographs of which appear in the March issue. Two drawers are designed to carry, in different compartments, materials which each student is likely to need during the course of the lesson. These drawers may be placed near the door, and each pupil takes his equipment with him to his seat as he passes the drawers coming in, replacing it when going out.

Another drawer carries the equipment which is needed only in special cases, where extensive repairs are necessary. This is placed where it is easy of access to any number of the class during the working portion of the lesson.

The cabinet is 30" wide, by 44" long, and 34" high; the left half having six drawers 19"x26", 3¾" deep, and one drawer 19"x26", 7½" deep. The right half has at the top a false drawer, on which the paper cutter rests, the bottom being a slide 25"x47", the back half of which passes between the first and second drawers on the left, and the first half of which holds the paper cutter. This is equipped with a false drawer front, having two handles by which the slide is pulled out and on which rests the paper cutter, with an aluminum slide telescoping under it, which is pulled out when the false drawer front is let down to catch cut paper.

Just under the paper cutter slide are two drawers 9¾"x26", 12" deep, and under this a compartment 19½"x26", 14" high, which is slotted top and bottom to hold eighteen exhibits mounted on heavy cardboard, which illustrate different steps in the course.

In the upper left-hand drawer, in separate compartments, are the bonefolders, brushes, erasers, mending tissue, oiled paper, and scissors.

In the second drawer are the auburn boards and stripping.

In the third drawer are the wires, awls, thread, needles and gummed vellum.

The fourth, fifth, sixth and seventh drawers on the left are storage spaces for miscellaneous supplies.

The left-hand drawer on the right side holds the glue and paste, while the right-hand drawer holds the pans and sponges.

The whole is on five-inch casters, with a four-inch, rubber-tired, ball-bearing wheel, which make it, though almost as heavy as a piano, very easy to roll from room to room, as the lesson is given to different groups.

The cabinet holds all supplies and equipment necessary for a semester's work in the course.

And last, but not least—the matter of interest on the part of the pupils themselves.

It was my misfortune, so I then thought, to have to switch a class from the much-desired "wood manual training" to book repair, in the middle of a semester. This was when necessity, impersonated by my principal and supervisor of the book repair work, Miss Blair, compelled me to make the change, and I am forced to admit that I was a great deal less enthusiastic over it than were the boys themselves.

For the first few weeks after the much-despised change from toy making to drudgery, I was beset by queries of: "How soon do we get back to 'wood manual training'?" (I had lightened the blow by telling them that as soon as we repaired all the books in the school we would go back to toy making—an impossible attainment for a single fifth grade in a 21-room building.)

But, toward the last few weeks of the term this query was replaced by sad remarks, among the boys themselves, of—"Gee! Only one more room left on the top floor. I'm afraid we're going to get that all done next week."

And the teacher, a "wood manual training" man of twelve years' experience, who does, and has always, enjoyed his shop work as much as any boy in his classes possibly could have, always looks forward with pleasurable anticipation to the two book repair classes out of his eighteen a week.

And, by a vote of the boys themselves, the classes are run on the basis of no communication between pupils, principally because, as one boy put it: "It's fine when I want to ask Johnny about somethin', but I can't get my own work done near so fast when he comes over to ask me somethin'; and anyhow, he wouldn't know as much about it as the teacher, even if I did ask him."

A Course in Joinery, General Carpentry, and Elementary Cabinet Making

Outlined by Joseph A. Shelly, Vocational Department, P. S. 32, Jersey City, N. J.

Objective: The following outlines were prepared with two objects in view. The first of these was to make a study of the materials, tools, and methods, common to all woodworking trades. The second and final objective was to teach the student the elements of cabinet making.

Plan: Our course covers a period of two years and is divided into four periods, designated as, Junior A and B; Senior A and B. These periods correspond to the 7A, 7B, 8A, 8B, academic grades.

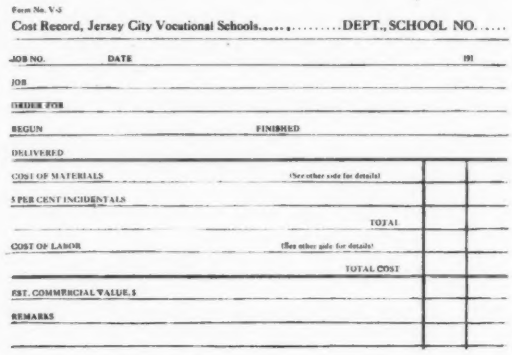
During the Junior A and B periods, the time is devoted to an intensive study of woodworking joints and tool operations. For this purpose we use "commercial projects,"' employing typical constructions. For teaching purposes, at this period, we divide these projects into small unit jobs. For example: we are to make some plain tables during this period, so we divide the project in the following manner:

A PLAIN TABLE

Main Processes	Unit Jobs
(1) Making Table Legs	(a) Planing Rough Stock
	(b) Squaring Ends and Cutting to Length
	(c) Laying out and planing Tapers
	(d) Laying out and cutting Mortises
	(e) Sanding
(2) Making Table Aprons	(a) Planing Dressed Stock to Width
	(b) Laying out and Chiseling Tenons
	(c) Cutting Screw Pockets
	(d) Boring Screw Holes
	(e) Smooth Planing
	(f) Sanding
(3) Making Table Top	(a) Jointing Pieces for Table Top
	(b) Laying out and Boring Dowel Holes
	(c) Fitting Dowels
	(d) Gluing
	(e) Planing Top to Width and Length
	(f) Smooth Planing Face of Top
	(g) Sanding
(4) Assembling	(a) Fitting Tenons to Mortises
	(b) Assembling Legs and Aprons Dry
	(c) Gluing Legs and Aprons
	(d) Squaring Legs and Aprons
	(e) Fastening Top
(5) Finishing	(a) Cleaning off Glue
	(b) Final Sanding
	(c) Staining and Filling
	(d) Varnishing
	(e) Rubbing
	(f) Re-varnishing

Apportionment of Time and Instruction: The Junior A and B periods are from November 24 to June 30, or about 141 days. The daily shop sessions are three hours in length, giving us a total of 423 hours of shop work during these two periods. Before the completion of the Junior B period, all of the students have been taught to use the oil grinder in the operations of grinding plane irons and chisels, as well as some of the simpler operations on the band saw, jointer, and mortising machine. A considerable amount of lathe work is also accomplished.

The Senior A and B periods are from the opening of school in September to June 30; approximately 197 days at three hours per day or a total of 591 hours for the two periods. The first half of the Senior A period is devoted to the study of advanced joinery and to the operation of the circular saw and other machines as per outlines. The last half of the Senior A, and the entire Senior B period, is what we term the "production period." At this time we concentrate on machine work and emphasize the shop method of handling jobs. The work is individual, with the smaller projects, or group with the larger pieces. All


Form No. V-5

Cost Record, Jersey City Vocational Schools.....DEPT., SCHOOL NO.....

JOB NO. DATE 191

JOB

ORDER FOR

BEGUN FINISHED

DELIVERED

COST OF MATERIALS (See other side for details)

5 PER CENT INCIDENTALS

TOTAL

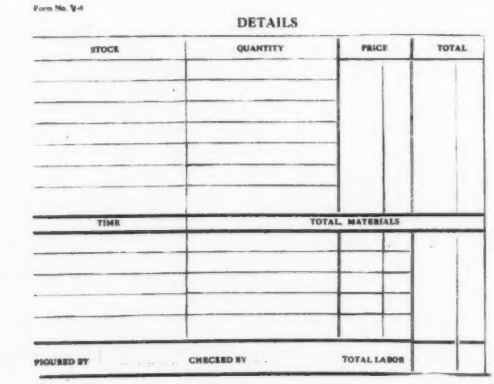
COST OF LABOR (See other side for details)

TOTAL COST

EST. COMMERCIAL VALUE, $

REMARKS

Front.


Form No. V-6

DETAILS

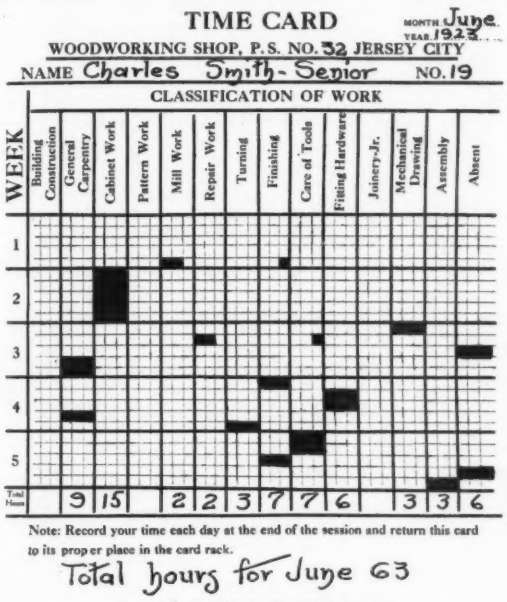
STOCK	QUANTITY	PRICE	TOTAL
TIME	TOTAL MATERIALS		
FIGURED BY	CHECKED BY	TOTAL LABOR	

FIG. 1.
Back.

group work is placed in charge of a student foreman who is responsible for results. We select for this period, only such projects as will afford opportunities for teaching the essential machine operations, and the commoner forms of cabinet construction.

Progress: Progress is noted on a suitable chart, prominently displayed. The captions at the head of each column on the progress chart are taken from the outline of instruction; only main processes are listed and in some cases these are condensed, in order that the chart shall not become too lengthy.

Time Cards: Time is recorded on a special card, for which a card rack is provided. These cards are the same for both senior and junior classes, but are distinguished by differing colors. Space is provided for recording time for one month on each card. Opposite the number of the week, and under each heading, are fifteen spaces. These spaces represent the fifteen hours available for shop work each week. The time worked on any particular type of work is recorded by blocking out a space for each hour


TIME CARD

MONTH June YEAR 1923

WOODWORKING SHOP, P. S. NO. 32 JERSEY CITY

NAME Charles Smith - Senior NO. 19

CLASSIFICATION OF WORK

WEEK	Building Construction	General Carpentry	Cabinet Work	Pattern Work	Mill Work	Repair Work	Turning	Finishing	Care of Tools	Fitting Hardware	Joinery-Jr.	Mechanical Drawing	Assembly	Absent
1														
2														
3														
4														
5														
Total Hours		9	15		2	2	3	7	7	6		3	3	6

Note: Record your time each day at the end of the session and return this card to its proper place in the card rack.

Total hours for June 63

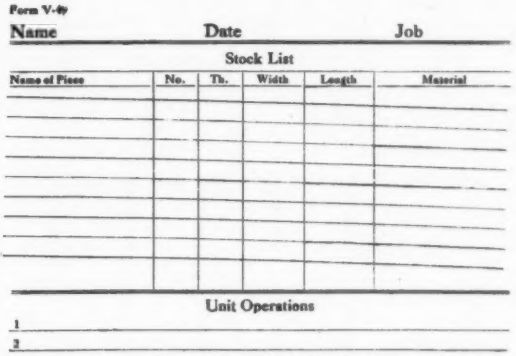
FIG. 2. STUDENT'S TIME CARD.

worked. Take for example the time card of Charles Smith for the month of June. June first fell on Friday, the fifth day of the first week. By consulting the card it may be seen that on that day Charles spent two hours on mill work and one hour finishing. The entire second week was spent in cabinet work, and his activities for the balance of the month are plainly recorded. On Thursday, the fourth day of the fifth week, he was absent; "had to go with his mother to buy a suit of clothes," and on Friday, the fifth day of the fifth week, he graduated and so spent his time at assembly in the school auditorium.

Mechanical Drawing: No effort is made to train draftsmen, but enough instruction is given to enable the student to make such drawings as may be required for shop use. A particularly talented boy is permitted to specialize, if he so desires. We try to have shop drawings for all of our projects, and these are made by those students who specialize. Our aim is to teach by reading drawings, rather than by trying to make them.

References: The following textbooks are used as references: Essentials of Woodworking, Griffith; Elements of Woodwork, King; Constructive Carpentry, King; Details of Cabinet Construction, Evans Bros. (publishers); Building Trades Pocket Book, I. C. S.

Correlation: A weekly outline of the shop work, with copies of the drawings used, is furnished the teacher of correlated work. This outline includes suggestions for emphasis in correlated teaching and suitable references to be looked up. Stock and cutting lists are made up in the classroom, whenever it is practicable to do so. A special card is used for this purpose; this card has spaces below the stock list form, for listing the unit operations employed in doing the job. Another printed form is used for computing and recording the cost and commercial value of each project undertaken. The director is kept informed of the progress of the shop work by a monthly lesson plan sheet. This plan is made out by the shop instructor, and furnished the director's office in advance of the instruction.


Form V-49

Name Date Job

Stock List

Name of Piece	No.	Th.	Width	Length	Material

Unit Operations

1

3

FIG. 3. ANALYSIS FOR UNIT OPERATIONS. SPACE IS PROVIDED FOR 20 OPERATIONS.

Method and Order of Instruction: The outlines that follow may seem rather formidable at a first glance, but when analyzed for teaching content, it is surprising how many of the main processes that are listed may be included in a single project. It is our practice to first analyze a job to determine its teaching content. If found suitable for our purpose, we make two sets of drawings, and to each we pin a copy of the analysis. One of these is for shop and the other for classroom use. The following is an illustration of such an analysis:

A TEACHING CONTENT ANALYSIS OF AN ELEMENTARY CABINET MAKING PROJECT

(Project) BOOK SHELVES (Senior B)

Teaching Content

Cabinet Constructions

Top and Bottom Stop Dadoes to Sides. Sides Rabbeted to receive Back.
Paneled Back with Vertical Muntins.
Shelves Supported by Metal Shelf Blocks.
Trimmed with Face Molding and Ornamental Base Board.

Mill Work

Circular Saw	Jointer	Band Saw
Ripping.	Edging.	Sawing Base Board.
Rabbeting.	Planing to Width.	Sawing Tops and Bottoms of Side Pieces.
Grooving.		
Stopped Dadoing.		

Bench Work

Smooth Planing.
Finishing Dadoes with Router.
Counterboring Screw Holes.
Planing Face Moldings.
Making Jig for Shelf Block Holes.
Boring Holes for Shelf Blocks.
Molding Edges of Shelves.
Assembling and Fastening Carcase.
Gluing and Screwing.
Squaring Carcase by Diagonals.
Fitting and Fastening Back.
Nailing.
Making Plugs and Plugging Screw Holes.
Fitting and Fastening Corner Blocks.
Fitting and Fastening Face Molding.
Fitting and Fastening Base Piece.
Sanding Flat Surfaces.
Sanding Curves.
Sanding Molding.
Staining and Filling.
Varnishing.

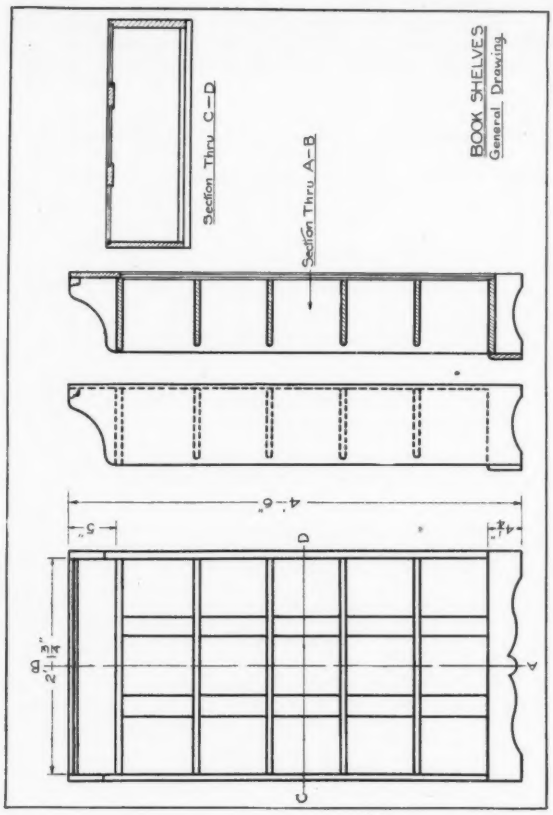
Each job is, in advance, fully discussed with the shop instructor, and the references "looked up" and stock lists prepared under the guidance of the classroom teacher. These latter are checked by the shop instructor before actual work is started. During the progress of the job through the shop, the cost of doing the work is computed and its probable commercial value estimated; these data are entered on the proper form and filed, to be used again at the end of the term in making up the yearly production sheet.

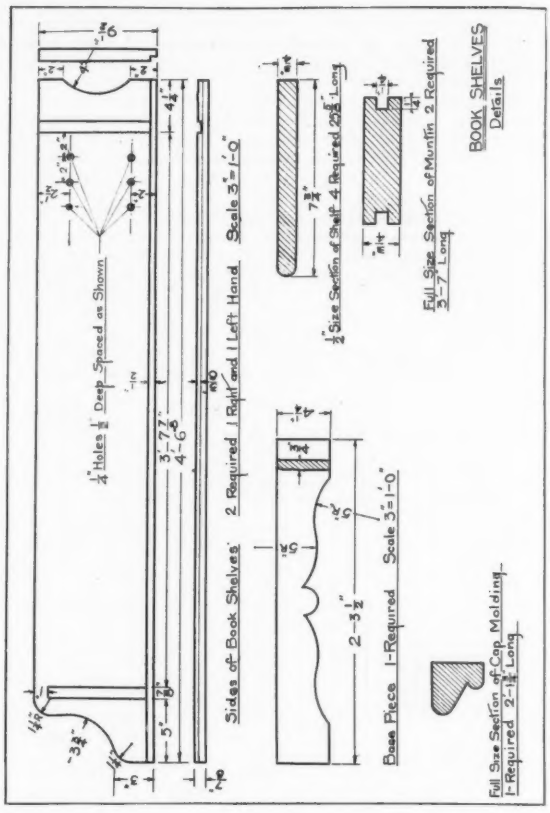
The order in which processes should be presented to the student has been a fruitful subject for more or less resultless discussion whenever trade teachers have met. It is obvious at the beginning of anything, and up to a certain point, that a definite order of presentation must be followed if we are to have effective teaching. We usually reach this point some time after we have passed the middle of the Junior B period. From that time on. it doesn't seem to make much difference what order we follow, so long as we manage to keep the boy interested. If human nature were standardized, advanced learning difficulties could be listed in sequence. Teaching, from being an art, would degenerate into a mechanical vocation.

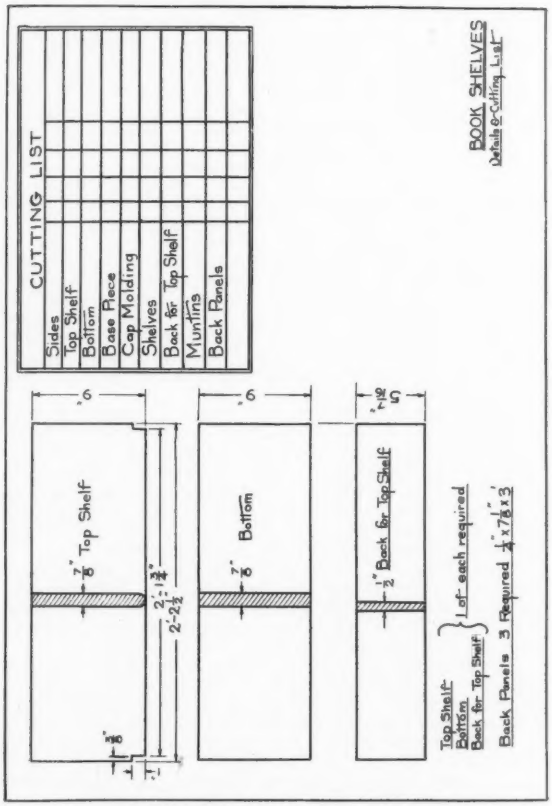
GENERAL CARPENTRY AND JOINERY

Outlined by Joseph A. Shelly, Vocational Department P. S. 32, Jersey City, N. J.

(1) **Squaring an End and Cutting to Length with a Hand Saw.**
Application: Any job.
References: Griffith's Essentials, Pages 9, 10, 11, 12, 13,




BOOK SHELVES
Details
Sides of Book Shelves 2 Required 1 Right and 1 Left Hand Scale 3"=1'-0"
Base Piece 1-Required Scale 3"=1'-0"
Full Size Section of Cap Molding 1-Required 2-1¾" Long
½" Size Section of Shelf 4 Required 2½" Long
Full Size Section of Muntin 2 Required 3-7" Long



DRAWINGS FOR A TYPICAL PROBLEM.

Paragraphs 1, 2, 3. Pages 21, 22, 23, 24, 25, 26, 27, Paragraphs 11, 12, 13, 14, 15, 16. King's Elements, Pages 57, 58, 59, 60, 61, 62, Paragraphs 27, 28, 29, 30, 31, Pages 67, 68, 69, 70, 71. Paragraph 37.

(2) **Ripping to Width.** Application. Any job.
References: The foregoing and Griffith's, Pages 19, 20, Paragraph 10.

(3) **Ripping a Taper.** Applications: Sides for a pitched hatch cover. Fitting flooring.
References: None.

(4) **Sawing Angles.** Applications: Saw Horses, Braces, Geometrical Figures, Hoppers.
References: Griffith's Essentials, Pages 13, 14, 15, Paragraphs 3 and 4. King's Constructive Carpentry, Pages 29, 30, 31, Paragraph 22.

(5) **Cutting an Opening with a Compass or Keyhole Saw.** Applications: Slots, Opening for drip pan in bottom of Umbrella Stands.
References: Griffith's Essentials, Pages 18, 19, Paragraph 9. Pages 47, 48, 49, 50, 51, 52, Paragraphs 36, 37, 38, 39, 40, 41, 42, 43, 44, 45. King's Elements, Page 90, Paragraph 50. Pages 93, 94, 95, Paragraphs 51, 52, 53.

(6) **Nailing.** Application: Any job.
References: Griffith's Essentials, Pages 75, 76, 77, 78, Paragraphs 65, 66, 67, 68, 69. King's Elements, Pages 63, 64, 65, 66, Paragraph 34.

(7) **Fastening with Screws.** Applications: Butt Joint Taboret, Stool, Table Top, etc.
References: Griffith's Essentials, Pages 78, 79, 80. Paragraphs 70, 71, 72, 73.

(8) **Planing Dressed Stock to Width.**

(9) **Smooth Planing.**

(10) **Planing Rough Stock.**

(11) **Planing Tapers.**

(12) **Mitering.** Applications: Picture Frame, Tenon Ends, Panel Molding, Crown Mold, Base Board.
References: Griffith's Essentials, Pages 101, 102, Paragraphs 97, 98. King's Elements, Pages 172, 173, Paragraph 96.

(13) **Planing Angles.** Applications: Hoppers, Miters, Taboret Top, etc.
References: None.

(14) **Planing Ends Square and to Length.** Applications: Any job.
References: Griffith's Essentials, Pages 29 to 46, Chapter 3. King's Elements, Pages 72 to 88.

(15) **Butt Joints.** Applications: Boxes, Crates, Miter Box, Plant Stand, Drawing Board.
References: Griffith's Essentials, Page 64. King's Elements, Pages 162, 163, 164, 165, 166, 167, 168, Paragraphs 90, 91, 92.

(16) **Rabbeted Joints.** Applications: Rabbeted Corner Box, Drawer Front, Closet Back.
References: Griffith's Essentials, Pages 106, 107, Paragraph 103; Pages 53 to 64; Chapter 5. King's Elements, Pages 88, 89, 90, Paragraph 46; Pages 193, 194, Paragraph 111; Pages 175, 176. (Fitting with a Chisel.)

AN INTERESTING CALENDAR.

The above leaf from the calendar of the Montclair high school is a splendid specimen of linoleum block printing, done under the direction of Mr. Frank A. Baker, instructor of printing. The calendar includes five leaves, illustrating respectively, a Christmas fireplace, a mountain scene, Robin Hood, a modern girl, and the Pilgrims. Each of these was made by a student of the class. Two of the plates are in four colors and three of them are in five colors.

(17) **Dadoed Joints.** Applications: Nail Box, Drawer Back and Partition, Medicine Closet Top and Bottom, Shelving.
References: Griffith's Essentials, Pages 87, 88, Paragraph 79.

(18) **Doweled Joint.** Applications: Table Top, Frames, Table Corner.
References: Griffith's Essentials, Pages 92, 93, Paragraphs 85, 86. King's Elements, Pages 186, 187, 188, 189, 190, 191, Paragraphs 107, 108.

(19) **Grooved Joints.** Applications: T and G Cleats, Drawer Bottom, Paneling, Flooring.
References: Griffith's Essentials, Page 110, Paragraph 107. King's Elements, Pages 160, 161, Paragraph 89.

(20) **Halved Joints.** (Cross Lap, Corner Lap, etc.) Applications: Frames for Doors, Window Screens, etc.
References: Griffith's Essentials, Pages 88, 89, 90, Paragraphs 80, 81, 82. King's Elements, Pages 174, 175, 176, Paragraph 97; Pages 184, 185, 186, Paragraphs 105, 106.

(21) **Mortised and Tenoned Joints.** Applications: Frames, Door Corners, Table Corner, Panel Work, etc.
References: Griffith's Essentials, Pages 94, 95, 96, 97, 98, 99, 100, 101, Paragraphs 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97. King's Elements, Pages 181, 182, 183, 184, Paragraphs 103, 104.

(22) **Gluing.** Applications: Any job.
References: Griffith's Essentials, Pages 80, 81, 82, 83, Paragraphs 73, 74, 75. King's Elements, Pages 118, 119, 120, 121, 122, 123, Paragraphs 65, 66, 67.

(23) **Chamfering.** Applications: Taboret Top, Corner Posts, Door Rails and Stiles.
References: Griffith's Essentials, Pages 45, 46, Paragraph 35.

(24) **Spokeshaving.** Applications: Curved Rails, Legs, Table Tops.
References: Griffith's Essentials, Pages 67, 68, 69, Paragrpahs 59, 60, 61. King's Elements, Page 90, Paragraph 49; Pages 210, 211, 212, Paragraph 120.

(25) **Gouging.** Applications: Molded Edges, Roughing out Crown Mold.
References: Griffith's Essentials, Page 58, Paragraph 51. King's Elements, Page 90, Paragraph 47.

(26) **Routering.** Applications: Grooves, Dadoes, Recesses, etc.
References: None.

(27) **Coping and Scribing.** Applications: Fitting Rails over Molded Edges of Stiles, Moldings, Fitting to a Rough Wall.
References: King's Elements, Pages 196, 197; Paragraph 114. King's Constructive Carpentry, Pages 123, 124, Paragraph 79.

(28) **Hopper Joints.** Applications: Flower Boxes and Flared Work.
Reference: Building Trades Pocket Book, Pages 248, 249. (Hopper Bevels.)

(29) **Dovetailing.** Applications: Box and Drawer Corners.
References: Griffith's Essentials, Pages 102, 103, 104, 105, 106, 107, 108. Paragraphs 99, 100, 101. King's Elements, Pages 199, 200, 201, 202, 203, 204, 205, Paragraphs 116, 117, 118.

(30) **Fitting and Hinging a Door.** Applications: Medicine and Supply Closet Doors, etc.
References: Griffith's Essentials, Pages 112, 113, 114, 115, Paragraphs 110, 111. King's Elements, Pages 227, 228. Building Trades Pocket Book, Pages 241, 242. (Fitting, Butts.)

(31) **Combination Plane.** Applications: Beading, Grooving, Tonguing, Rabbeting, Dadoing, etc.
References: Griffith's Essentials, Pages 105, 106, Paragraph 101; Page 110, Paragraph 107.

(32) **Laying-Out.**
References: Griffith's Essentials, Page 70, Paragraph 62; Pages 84, 85, 86, Paragraphs 76, 77.

(33) **Finishing.**
References: Griffith's Essentials, Pages 71, 72, 73, Paragraphs 63, 64; Page 150, Chapter 13. King's Elements, Pages 97, 98, 99, 100, 101, 102, Paragraphs 55, 56; Pages 122, 123, 124, 125, 126, 127, Paragraphs 67, 68; Page 128, Chapter 6. Building Trades Pocket Book, Pages 357, 358, 359. (Painting.)

(34) **Grinding Tools.**
References: Griffith's Essentials, Pages 58, 59, Paragraph 52. King's Elements, Pages 105, 106, Paragraphs 60, 61.

(35) **Honing Tools.**
References: Griffith's Essentials, Pages 60, 61, 62, 63, 64, Paragraphs 53, 54, 55, 56, 57. King's Elements, Pages 76, 77, 78, 79, 80, Paragraph 40.

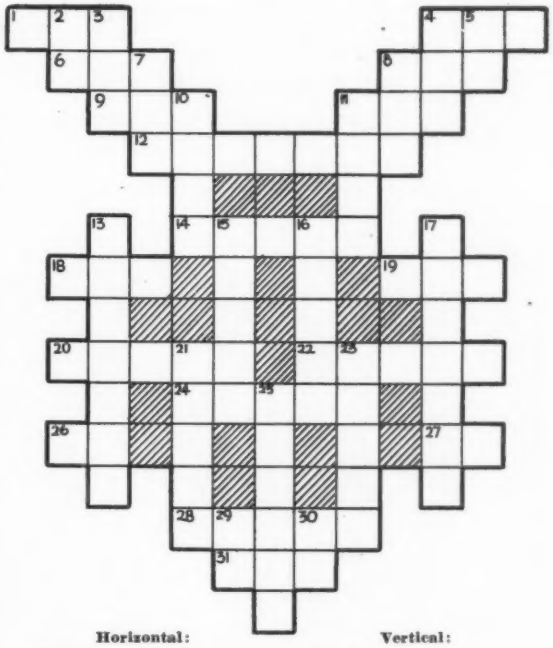
(36) **Filing and Setting Saws.**
References: Griffith's Essentials, Pages 27, 28, Paragraph 17. King's Elements, Pages 109, 110, 111, 112, 113, Paragraph 64. Disston's Hand Book.

A CROSS-WORD PUZZLE FOR THE CARPENTRY CLASS

Joseph B. Kelly, Johnson School, Richmond Hill, Scranton, Pa.

This puzzle is made up of trade terms and is one of a series which have been developed to stimulate interest in trade language and to broaden the vocabulary of the boys. The puzzles are given out on Friday and the class is asked to work out the answers over the week end.

A stylus and mimeograph in the school make the duplication simple. The planning of the puzzle takes time, but is a pleasure when once undertaken.



Horizontal:

1. Boring Tool
4. Used with a bolt
6. To cut with
8. To saw with the grain
9. Modern
11. To polish
12. A type of handsaw
14. Part of a door
18. A wood used for finishing
19. A genus of Tree
20. Part of frame of house
22. Pertaining to a roof
24. Meaning corridor
26. Preposition
27. Point of a compass
28. Short branch of a tree (pl.)
31. Unit of land measure

Vertical:

2. Part of "to be"
3. A color
4. A point
5. Aloft
7. A thin metal sheet (saw)
10. To twist
11. Part of a fence
13. Part of a roof (pl.)
15. A boring tool
16. To rub out
17. A type of mill
21. Implements
23. Drawings
25. Damage
29. Pennsylvania (abb.)
30. A prefix

(See page 100 for key to puzzle.)

PROBLEMS & PROJECTS

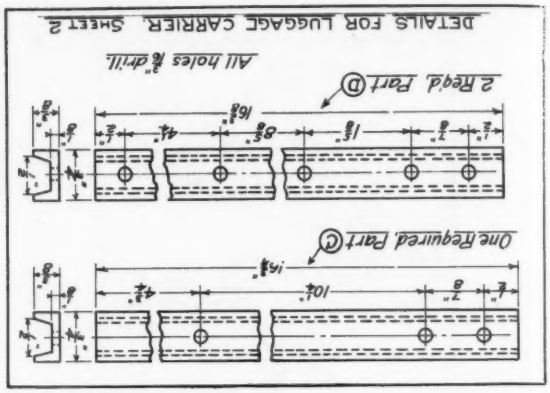
This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

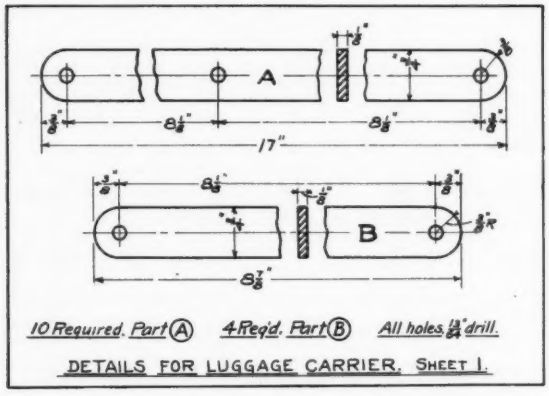
LUGGAGE CARRIER

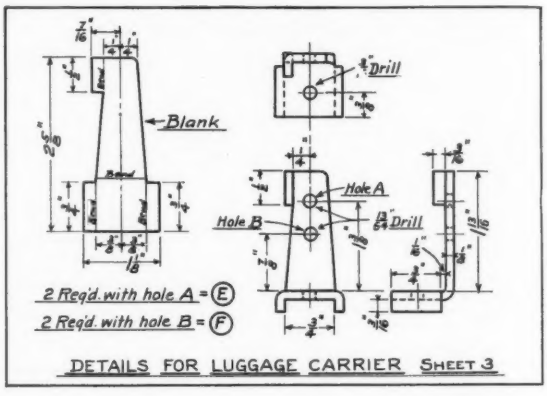
A. P. Mattier, Compton, California

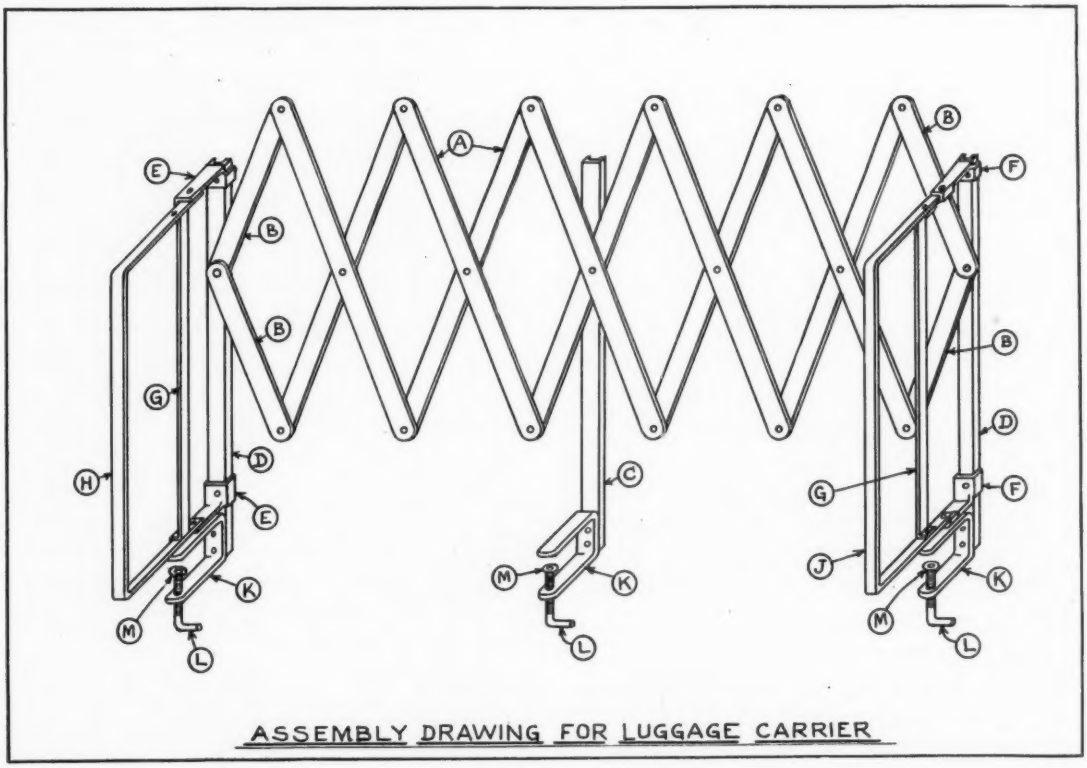
The luggage carrier is a very good project for first-year machine shopwork.

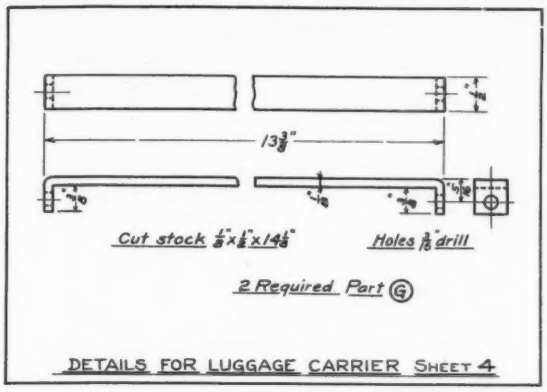


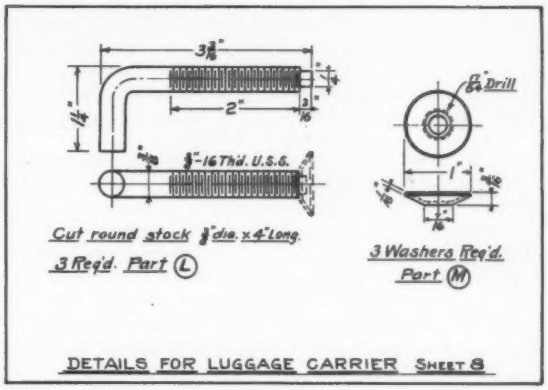
The operations necessary to make this one are: measuring, sawing, chipping, filing, drilling, riveting, bending,

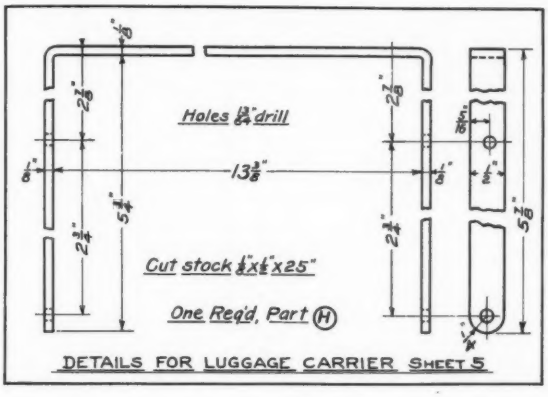


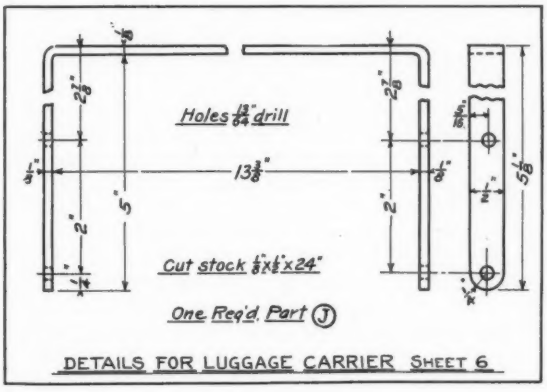


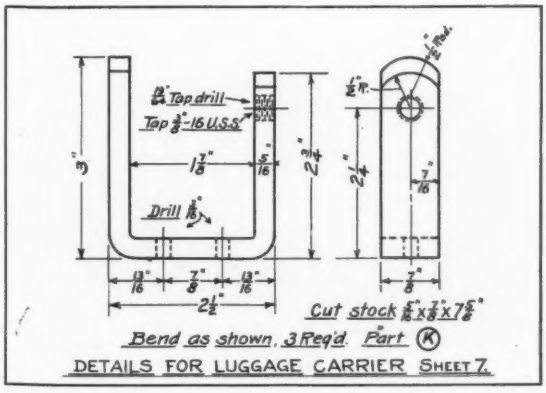












threading, tapping, turning, and painting.

The tools necessary to perform the job are: an 18" mach. scale, hack saw, hammer, chisel, center punch, file, two drills, ⅜ U. S. S. die, ⅜ U. S. S. tap and rivet set.

The end of the screw should be turned down to size, with a square shoulder for the cupped washer to rest upon.

A punch-and-die may be made for cupping the washers, by turning the end of a piece of shafting to the desired shape and then rounding off the end of another piece of shafting to fit the curve of the first. This punch-and-die should be tempered or at least case-hardened.

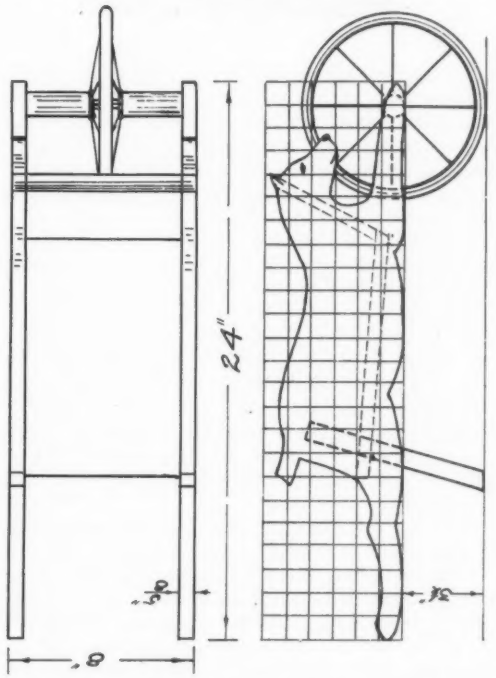
The time required for a student to make one is about 20 hours. Accuracy required is 1/64".

We have made several in our machine shop and find that they are a very useful and popular shop product.

DOG WHEEL-BARROW

Paul L. Cressman, Erie, Pa.

The dog wheel-barrow was a very popular project in the day and night school. Almost every one was built slightly different. Some were spread to 12 inches wide



in back; others were straight; some were built with wooden wheels; others used the "extra" baby carriage wheel. A ⅜" iron rod was used for the axle with two round pieces of wood for spreaders. Instead of wooden

legs some used metal, bent and fastened directly under the sides, and these were riveted to a brace. In the painting of the rat-terrier most of them differed. These were built to endure the treatment usually given such toys.

THE ORANGE-CRATE AND CANDY-BUCKET BIRD HOUSE SUPPORT

C. Anthony Van Kammen, Grand Rapids, Michigan

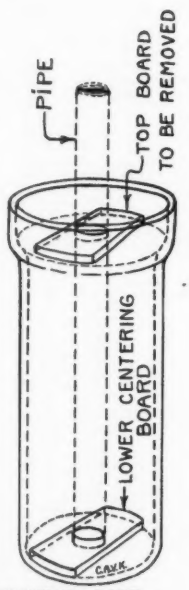
The orange-crate and candy-bucket bird houses have proved quite popular, particularly the martin house. Neighbors and friends, convinced that the house was practical and that martins really do build in them, have had similar ones built for themselves. For the benefit of those who made the martin house, as shown on page 192 of the May, 1924, INDUSTRIAL ARTS MAGAZINE, or who may care to build a house for this year, the accompanying photographs and drawings are shown. The method of supporting the house is a simple one and makes it available

FIG. 1.

for cleaning and for storing in the cellar or garage during the winter months. In the spring, a week or so before the martins are expected to arrive in the neighborhood, the house can be set out. Martins occupied the house within a week after it was placed in the garden.

As martins are much on the wing and like to swoop down to their house, the home is best placed in the open, away from houses and trees. Telephone or electric wires crossing over the martin house are quite desirable as martins often are content to sit in colonies on such perches when at rest. The proper height for the house above the ground is from fifteen to twenty feet. The house in the photograph is fifteen feet above the ground. A two-inch pipe (discarded boiler tubes are satisfactory) eighteen feet long, is threaded to fit a flange with a four and one-half or five inch face. This flange is screwed to the center of the underside of the bird house. The other end of the pipe is set in the ground a distance of from two and one-half to three feet.

In order that the shaft or pipe may stand upright and be removable at any time, an eight-inch or ten-inch tile pipe three feet long is set perpendicularly in the ground, with the bell or flanged end a few inches above the earth's surface. (See Figs. 1 and 3.) A piece of wood, with a hole the size of the pipe, is fitted in each end of the tile to keep the pipe supporting the house erect while the concrete is poured. (See Fig. 2.) There should be room on each side of the upper piece of wood to pour concrete into the tile and tamp it down. A 1:2:4 mixture of concrete should be used of a consistency similar to that used as a



PHANTOM VIEW—
FIG. 2.

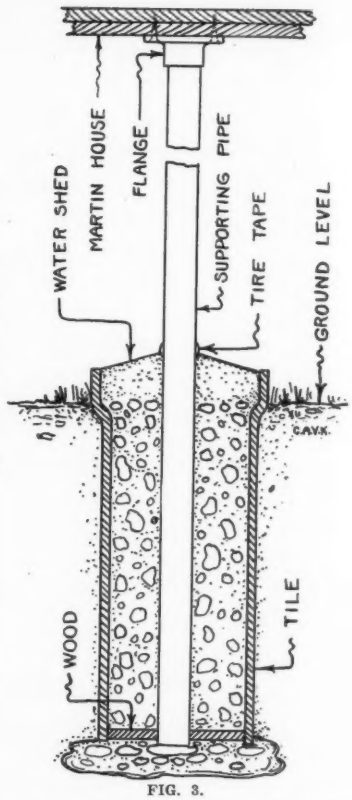


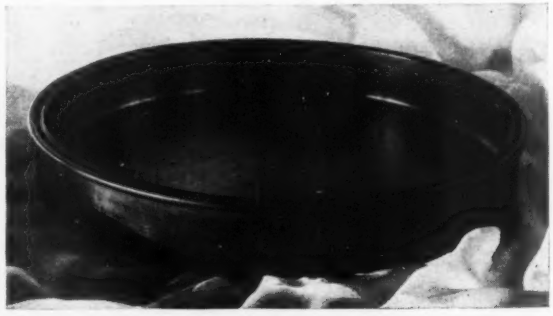
FIG. 3.

base for cement walks. As the shaft is to be removed, the pipe should be well oiled or greased on that portion which is to go in the cement so that it will not stick after the concrete starts setting. Turning the shaft with a heavy pipe wrench, as the work of filling the tile proceeds, helps to keep it free and makes it less difficult to withdraw. After the concrete has set, the top centering board should be raised out of the bell end of the tile, and a smooth layer of cement filled in, building the cement up slightly near the post to form a sort of cone to shed water. Tire tape wound tightly around the pipe, just where it leaves the cement, prevents water from running into the hole causing rust and corrosion.

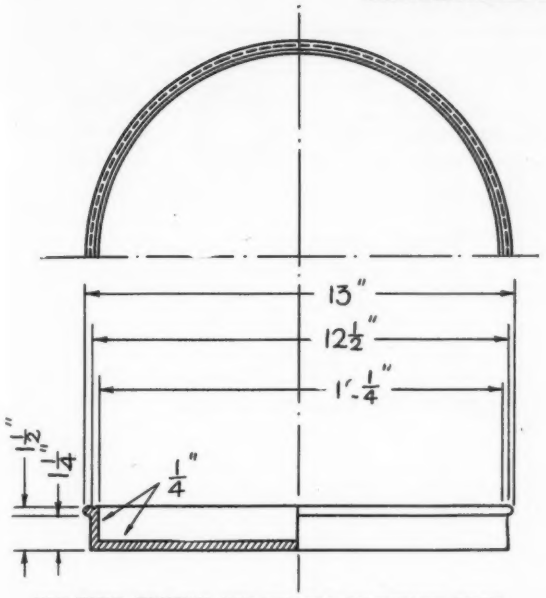
A PRACTICAL PROBLEM IN FACE-PLATE TURNING

Miss Zeal Z. Wilson, Denton, Texas

A large number of the problems we make in wood-turning are designed primarily to show what can be done on the lathe. These may be excellent exercises and require a great deal of skill in the manipulation of turning tools, but many of them have no value from the utilitarian



THE COMPLETED TRAY.



TOP VIEW, SECTION AND PROFILE OF TURNED TRAY.

standpoint. If they are artistic in line, and are good from the standpoint of training in technique, perhaps there may be some excuse for their use; but why can we not make problems that combine beauty and utility, and at the same time require skill in technique?

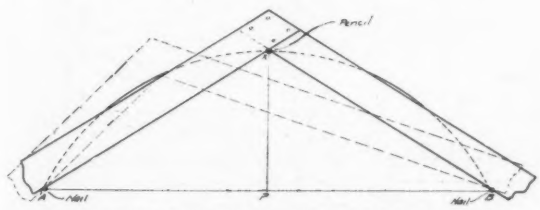
The tray in the accompanying photograph, made of a thoroughly seasoned knot of black walnut, being, as the drawing shows, turned to the thickness of one-fourth inch, makes a problem in the nice use of tools for the most skilful wood-turner. Heavy, turned pieces always give a clumsy and unattractive appearance. While this tray is not so thin that it has a fragile appearance, it is thin enough to be light and graceful. The author being a woman sees many uses for such a tray. As a serving-tray it is just what one needs for small articles of food, cream, sugar, lemon, etc. As a receptacle for small articles on the dresser, it is exceedingly useful.

This is a problem in chuck or face-plate turning. The processes involved are not different from those used in any other chuck problem where inside turning is required. The details are perfectly obvious from the drawing. Lines, proportions, and certain details may be changed to suit individual tastes but the project as presented, I believe, meets the requirements of design and utility, and presents at the same time work sufficiently difficult to be of value to students fairly accomplished at the lathe.

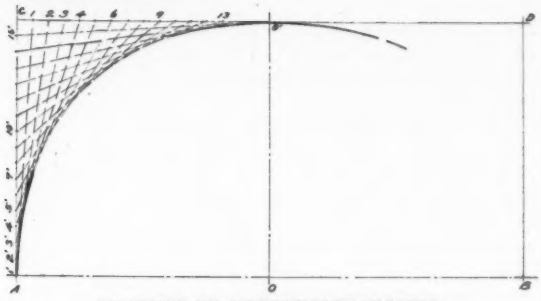
LAYING OUT CURVES IN CARPENTRY AND CABINET WORK

H. H. Todd, Amsterdam, New York

Three short methods often used on the job for lay-out work by carpenters, have been found useful in our cabinet-making course, and have proven a source of interest to the pupils. Large circles, arcs, and ellipses are usually hard to lay out, especially on the work itself.



TO DRAW AN ARC WITH A GIVEN CHORD AND RISE.



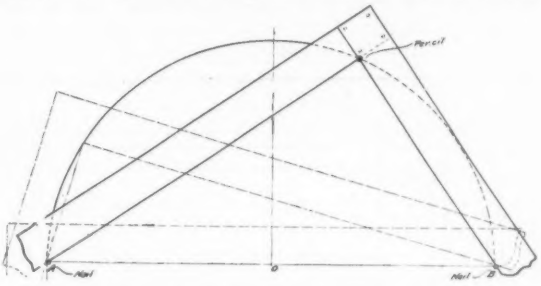
TO DRAW AN APPROXIMATE ELLIPSE.

The method illustrated will be found useful in swinging curves for sidewalk corners, flower beds, archways, and long rails. The size of the arc and circle is limited only by the stock at hand for making the jigs.

In drawing the circle by means of a square, nails are driven at the extremes of the diameter of the desired circle. Then with a pencil held in the 90° angle, the square is placed in position as shown, and turned slowly, keeping the two legs of the square pressed against the nails. Boys who have had geometry will be interested in this practical application of a problem from the book.

In drawing an arc of given dimensions, the chord and rise must be laid off, before fastening the two parts of the jig together. Afterward the methods to be followed is the same as in the previous problem.

The approximate ellipse has often been used in archways, porch openings and rails on furniture. Carpenters use a chalk line when cutting an archway with this method. Nails are driven at the numbered points. It will be noticed that the distances O′C and A′C are divided



TO DRAW A PERFECT CIRCLE WITH A SQUARE.

into the same number of parts. In using this method, first lay off the distance O′C into any number of equal parts. Divide A′C into the same number of equal parts. Connect 1-1, 2-2, etc., by chalk line or pencil line. This method may be used to lay off an ellipse quickly, on any surface, no matter how large.

JUNIOR HIGH SCHOOL PEDESTAL

J. W. Bollinger, East Junior High School, Sioux City, Iowa

This pedestal is the result of an effort to combine pleasing proportion and simplicity of construction, and is very well adapted to the capabilities of junior high school pupils.

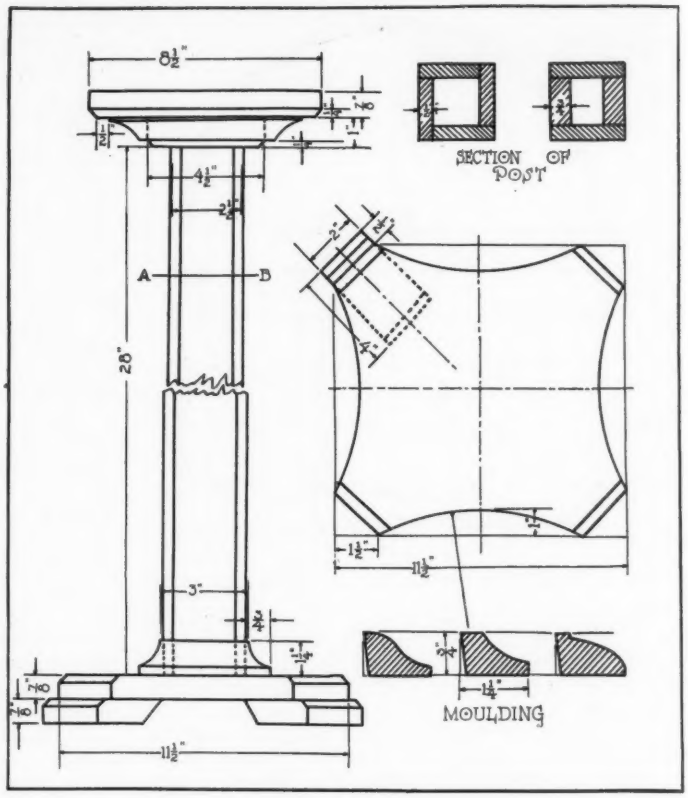
The post may be made either entirely of ½-inch material, or two pieces of ¾-inch stock may be worked in as shown. The latter is the stronger construction. The pieces are glued together and nailed at each end; afterward the ends are trued with the help of the T-bevel square. The taper of only ½ inch to 28 inches has been found more pleasing than a greater slant would be.

The top is fastened to the post by means of screws passing through an intermediate piece, first into the post, and then into the top. The intermediate piece is thicker

than the moulding and also serves as part of the ornamentation of the pedestal. Screws fasten the feet to the bottom, and the bottom to the post.

The mouldings, shown on the drawing, are stock forms from the lumber mill; they are toe-nailed in place and are mitered and cut back to insure a perfect fit. Other shapes of moulding may be made in the shop, if suitable planes are at hand.

The pedestal works up well in either oak, walnut, or mahogany, according to the requirements of the room into which it is to be put.



DETAILS OF PEDESTAL.

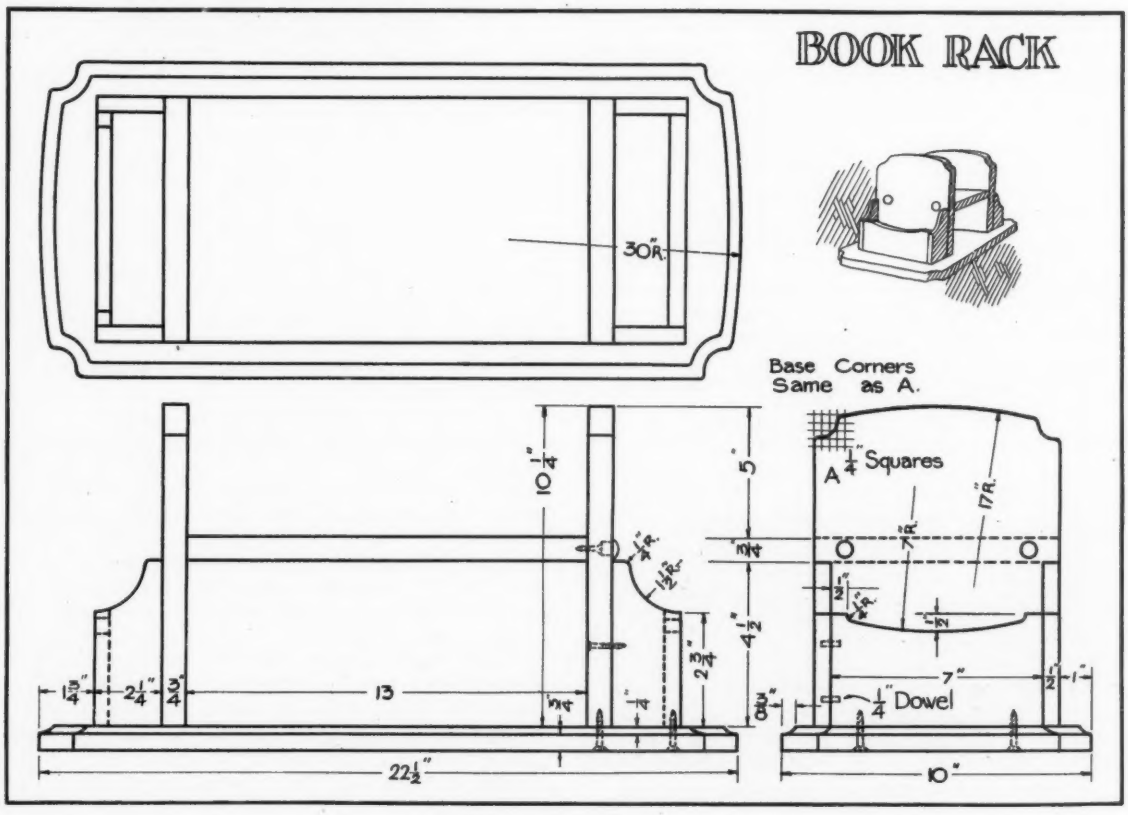
A COMBINATION BOOK RACK

C. A. Rosell, Indianapolis, Ind.

The book rack seems a never ending problem among manual training projects and is perhaps somewhat over-worked, but the accompanying drawing shows a combination book rack that is extremely utilitarian as well as pleasing to the eye. It makes possible the disposal of a great many things that constantly litter a table.

The central compartment below is large enough to receive the average size periodicals, and space is provided for quite a number of them. The compartment above is of course for books and will accommodate as many as one cares to have placed at one's immediate disposal. As for the end pockets, they are convenient places for stationery and as receptacles for the daily mail.

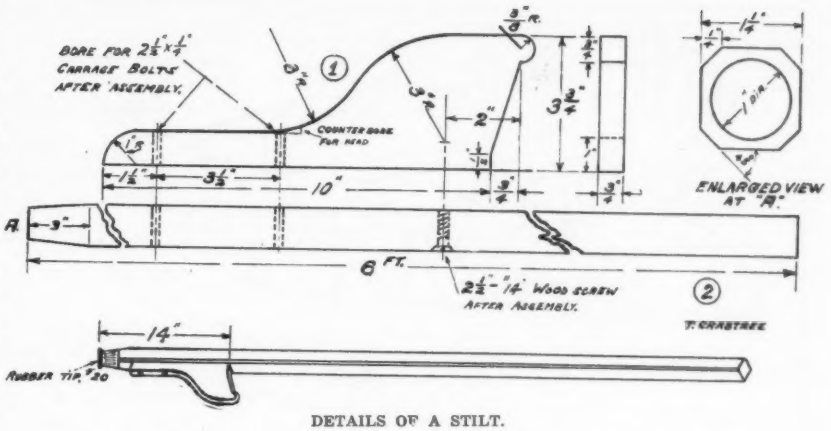
The construction is not very difficult and the assem-



DETAILS OF BOOK RACK.

bling is made easy by the use of screws. This makes it possible to take the book rack apart if, for any reason, one should care to do so. The shelf may be lowered, if one objects to the plugs as shown in the drawing, and the screws placed so that the upright parts of the end pockets cover the head of the screws.

The treatment of the corners, as shown, is merely suggestive of what may be done. There is no reason why many of the suggested book rack designs may not be satisfactorily applied to this type of combination book rack.



DETAILS OF A STILT.

JOB INSTRUCTION SHEET FOR STILTS

Thomas Crabtree, Oswego Normal School, Oswego, N. Y.

Materials: 1 piece for steps, ¾"x5"x1"—Maple; 1 piece for staffs, 1¼"x2¾"x6'—Spruce or Pine; 4 Carriage bolts and nuts, ¼" dia., 2½" long; 2 Wood screws, 2½"—No. 14; 2 Rubber tips, 1" dia.—(No. 20, Hammacher, Schlemmer & Co., N. Y.)

Machines and tools: Jointer; Rip-saw; Band-saw; Plane; Marking gauge; Dividers; Chisel, 1"; Spokeshave; Clamps; Brace and bits, ¼" & ½"; Wrench; Screwdriver.

Processes involved: Jointing; Ripping; Cut-off; Marking; Layout; Sawing; Chamfering; Chiseling; Sanding; Gluing; Clamping.

Operation routine: 1. Select straight grained stock for staff, cut and dress to required dimensions, 1¼"x1¼"x6".

2. Mark off 45° chamfer and plane to lines.

3. Locate center on end of staff and strike a 1" circle.

4. From this end mark off 3" and tape to circle, to fit for rubber tip.

5. Lay out step on stock, and saw on band saw.

6. Clean up saw, cut with chisel and spokeshave; sand smooth.

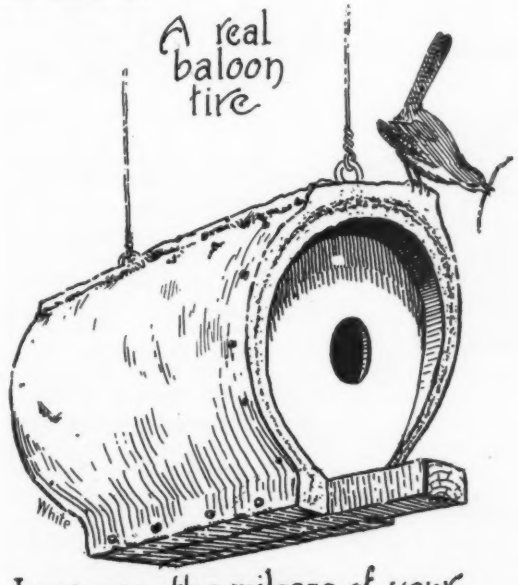
7. Locate step on staff, as per drawing; glue and clamp in position.

8. When glue has set, locate and bore holes for bolts. Counterbore where upper bolt intersects radius on step. Secure bolts in position (heads on the inside of staff). Drill for screw and fasten same in position.

9. Secure rubber tip in position, using a good cement.

10. Varnish with spar varnish, or paint as desired.

The material given is for one pair of stilts. Where quantities are desired, a template for the step will aid in production. The material can be nailed together, to cut any convenient amount on the band saw.

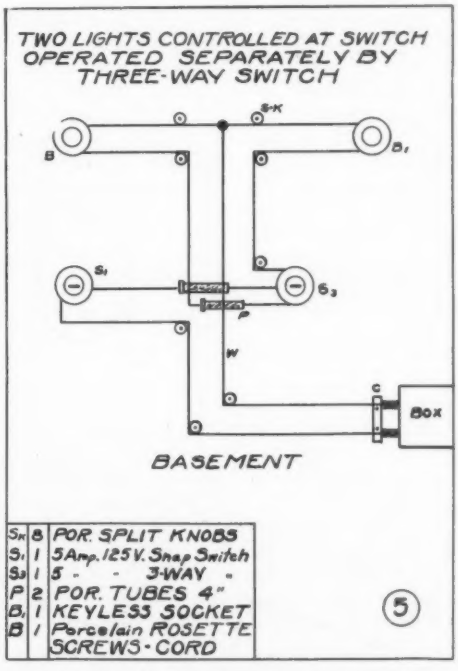


DETAILS OF BALLOON TIRE BIRD HOUSE BY W. W. WHITE, WATERLOO, IA.

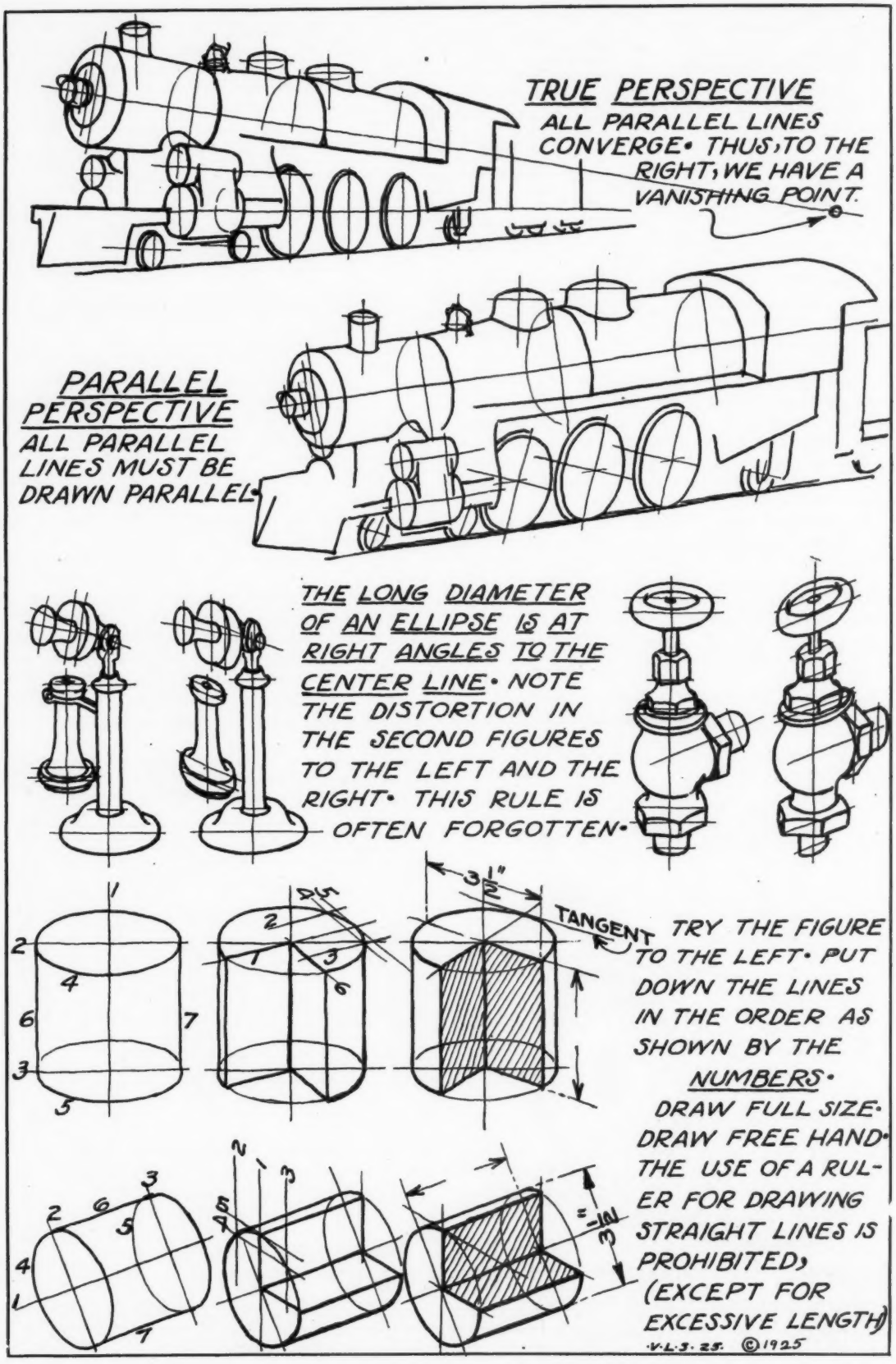
ELECTRIC LIGHT WIRING

Emerson W. Manzer, Madison, Wisconsin

These problems have been used successfully with classes in elementary electric wiring. As a means of economizing space and materials a "working board" was used, at which four boys worked simultaneously.


TWO LIGHTS CONTROLLED AT SWITCH OPERATED SEPARATELY BY THREE-WAY SWITCH
BASEMENT
BOX
Sw 8 POR. SPLIT KNOBS
S1 1 5 Amp. 125 V. Snap Switch
S3 1 5 - - 3-WAY -
P 2 POR. TUBES 4"
B1 1 KEYLESS SOCKET
B 1 Porcelain ROSETTE
SCREWS - CORD
5

DETAILS OF AN ELECTRIC WIRING PROBLEM.


TRUE PERSPECTIVE
ALL PARALLEL LINES CONVERGE. THUS, TO THE RIGHT, WE HAVE A VANISHING POINT.
PARALLEL PERSPECTIVE
ALL PARALLEL LINES MUST BE DRAWN PARALLEL.
THE LONG DIAMETER OF AN ELLIPSE IS AT RIGHT ANGLES TO THE CENTER LINE. NOTE THE DISTORTION IN THE SECOND FIGURES TO THE LEFT AND THE RIGHT. THIS RULE IS OFTEN FORGOTTEN.
TANGENT
TRY THE FIGURE TO THE LEFT. PUT DOWN THE LINES IN THE ORDER AS SHOWN BY THE NUMBERS.
DRAW FULL SIZE. DRAW FREE HAND. THE USE OF A RULER FOR DRAWING STRAIGHT LINES IS PROHIBITED, (EXCEPT FOR EXCESSIVE LENGTH)
V.L.S. 25. ©1925

A SUGGESTIVE PLATE OF PROBLEMS IN TRUE PERSPECTIVE.
Prepared by Prof. V. L. Sherman, Lewis Institute, Chicago, Ill.
This is the first of a series of six helpful plates for teaching true perspective in a simple, direct manner.

THE MIDDLE WEST CONVENTION

The Vocational Education Association of the Middle West held its eleventh annual convention in Chicago, February 12, 13, 14. As an Association, it probably reached its high mark of attendance and influence during this convention. It is a far cry from this out-standing meeting of national scope to the evening eleven years ago when about ten men seated themselves around the dinner and conference table at the Chicago City Club to launch this organization. I am happy to have been present and to have made the motion to organize the Vocational Education Association of the Middle West.

The recent meeting of this Association marked the realization of many of the hopes of those at the first conference and justified their confidence in the ability of the men and women of the Middle West to "put across" this great undertaking. This meeting had perhaps the largest attendance in the history of the organization, and yet so great and so rapid have been the changes that it was difficult in this instance, as it is in most meetings, to secure sufficient railroad certificates to claim the reduced fares. This situation arises out of the fact that the majority of those who attend such meetings in Chicago now drive over the majestic highways that spread over this part of the country instead of taking the trains.

In some respects the February meeting in Chicago resembled all other great meetings and conferences of people engaged in the Industrial, Vocational, Art, Agricultural, Commercial, and similar lines of work. Many of the familiar figures that have for a generation fostered and fought for this new field of education were to be seen on every hand, in every session, and in every corridor. There were Bogan and Bennett, and Leavitt and Prosser, and Smith and Bachrach, and Hawkins and Wright, and Miss Murtland and Roberts, and Gustafson and Cooley, and a host of others.

The distinguishing feature of this convention was the quality of its program. Perhaps never in the history of practical and vocational education has a program been made up so completely of specific topics of vital and pressing importance and speakers who had come to contribute their own achievements and to report the actual results of painstaking and scientific investigation. The educational spell binder and hot air venders were throttled down to a minimum, and the practical man on the job with his sleeves rolled up had the right of way. Such people as Barker of Rochester, Gustafson of St. Louis, Cooley and Rodgers of Milwaukee, Emerson of Joliet, Smith of Michigan, Christy of Cincinnati, Yoder of Wisconsin, Smith and Storm of Minnesota, Garvey of the Western Electric Company, Filby of Chicago University, and a score or more of others who are "putting across" a real job of practical education made notable contributions to the discussions of this meeting.

Although various sectional meetings were held Thursday morning, February 12th dealing with Agricultural Education, Apprentice Training, Home Economics, Commercial Education, Industrial Education, and Vocational Guidance, the convention proper opened Thursday afternoon with a general program on Vocational, Pre-Vocational Civics, and Practical Arts Courses in the junior high school. Mr. Leavett, Mr. Hawkins, Mr. Roberts, and Mr. Wright took the leading parts in the discussion.

Thursday evening was the annual banquet. An annual banquet of the Vocational Education Association of the Middle West simply would not be an annual banquet of the Vocational Education Association of the Middle West without Wm. J. Bogan as toast master, so according to the time-honored custom, Mr. Bogan presided in his usual charming and masterful manner. The program consisted of addresses on Unity of Education by Supt. William McAndrews of Chicago, and Giving a Life by Getting a Living, by Dr. Steiner of Grinnell College.

Friday morning was entirely given up to visits to the schools and industries of Chicago. Of course, Chicago is the great convention city for school people, with its great variety of schools, industries, and interesting sights—not to mention its theaters and other features of entertainment. Chicago, with its school people and its Chamber of Commerce, rather out-did itself in caring for this convention of the Middle West Association.

All Friday afternoon was given over to the various sectional meetings dealing with a half-dozen or more special interests in the field of Practical Education. There was a general feeling that one of the most interesting series of programs during the convention was furnished by the Agricultural Education section. With such speakers as Tiffany of Wisconsin, Fife of Ohio, Boyd of Missouri, Smith of Illinois, Gallup of Michigan, and others occupying similar positions, any program would attract unusual attention. The agricultural people have probably made more definite and rapid progress than any other group. Such subjects as Graduate Study in Vocational Agriculture, Securing Adequate Farm Practice, Standards for Rating Departments of Vocational Agriculture, Measuring the Effectiveness of Agricultural Instruction, indicate something of the scope of agricultural education and the grasp which the present workers in this field have on this subject. Almost as flattering statements could be made concerning the Home Economics and the Commercial Education sections. These sections were well attended. Well selected and timely topics were most ably handled in almost every instance.

The meeting of Associated Teachers of Printing was a most interesting one. The topics of Art in Printing, Vocational Courses, High School Newspapers, Correlating Book Binding and Printing, and other topics were handled by Miss Stillwell of the Chicago Art Institute, Mr. Detrick of Cicero, Illinois, Mr. McMurry of the Chicago Normal College, and Mr. Bauersfeld and Mr. Worst of the Chicago city schools.

In connection with the Middle West convention, the Illinois Manual Arts Association held its annual meeting on the afternoon of Friday, February 13th. The general subject was the Future of Manual Training. Mr. Gustafson of St. Louis read a most interesting and valuable paper on the Future of the Regular Manual Training Teacher. It was a most encouraging and optimistic discussion. Mr. Rodgers of the Milwaukee Vocational School discussed the Individual Instruction Sheet versus Class Demonstration. This aroused spirited, prolonged, and profitable general discussions from the floor. It is altogether probable that Mr. Rodgers in this and other addresses made one of the distinct contributions to the convention.

No report of this Middle West convention could be complete without a comment upon the thoroughly adequate, well-appointed and happy way in which the convention was housed at the Hotel Sherman. The entire mezzanine floor was devoted to the commercial exhibits. A more varied and elaborate lot of exhibits one seldomly sees at a convention. Every known line of machines, tools, materials, appliances, books, etc., used in or concerned with the various lines which this organization promotes, was shown in this full and complete exhibit. Furthermore, these exhibits were in the hands of most agreeable and accommodating men and women, who, through the years have been among the staunchest, most dependable and most helpful friends of the Vocational Education

Association of the Middle West and, indeed, of every line of practical education.

The forethought and wisdom of the local committee on arrangements were such as to perfect the plan of having all the meetings of the convention on one floor of the hotel, and that the second main floor. This most desirable arrangement made it possible for the members of the convention to visit the commercial exhibits on the mezzanine floor within a few steps of the floor on which all the meetings were held.

At the meeting of the Executive Committee of the Middle West Association it was decided to continue the negotiations with the National Society for Vocational Education with a view to cooperating with the National Society to the extent of becoming its regional division for the purposes of meetings.

The thanks of the Association were freely expressed in resolutions and a genuine appreciation was deeply felt by all members for Chicago's well-known hospitality and for the unusual provisions made for this convention by the Superintendent of Schools and all of his co-workers, together with the Chamber of Commerce and the various city officials. It was a great and thoroughly successful meeting. It made distinct contributions to the work and progress of Industrial, Vocational, Agricultural, Home Economics and Commercial work, and all the related forms of practical education.

The report of the nominating committee struck a popular chord when it recommended the reelection of Mr. Lewis Gustafson of St. Louis as president for the next year. The complete list of the officers as submitted by the committee and unanimously elected is as follows: President, Lewis Gustafson, St. Louis; Secretary, Leonard W. Wahlstrom, Chicago, Ill.; Treasurer, James McKinney, Chicago, Ill.

EASTERN ARTS ASSOCIATION CONVENTION

The annual convention of the Eastern Arts Association will be held in Springfield, Mass., April 23rd, 24th, and 25th.

In cooperation with the local convention bureau, the advisory and executive chairmen have prepared exhibits, lectures, and receptions and excursions for the benefit of the visitors who will be attracted to the meetings. The chamber of commerce, through the convention bureau, has issued a special invitation to the teachers to visit the city and to take advantage of the wealth of ideas offered in the conferences.

The commercial and educational exhibits in connection with the convention will be located on the main floor of the Municipal Auditorium, where lighting and abundant floor space are fully adequate for the occasion. The exhibit of the Springfield schools will be housed on the basement floor of the auditorium.

Information concerning the exhibits may be had by addressing inquiries to Mr. Harry W. Griffin, chairman, Forest Park Junior High School, Springfield, Mass.

THE FIFTH ANNUAL MEETING OF THE INDUSTRIAL TEACHERS OF OKLAHOMA

The trade and industrial teachers of Oklahoma held their annual meeting with the Oklahoma Educational Association, in Oklahoma City, on February 12th, 13th and 14th.

At the meeting of the directors of industrial arts in teacher-training institutions there were discussed many problems obtaining in these institutions. Officers were elected to prepare a regular program for the next meeting in 1926.

The first session was well attended, with Prof. DeWitt Hunt, of the A. and M. College at Stillwater, presiding. He made a brief review of previous meetings, pointing out their benefits and objections. Mr. R. C. Bowman, supervisor of industrial arts, Okmulgee, read a paper on "Finding Courses in the Okmulgee City Schools." These courses are offered in the seventh and eighth grades, a two-year junior high school and a four-year senior high school. One-third of these are shop courses, offering both lecture and laboratory instruction. Mr. Fred W. Heister, director of industrial arts, of Ponca City, gave a general report on the Night School, showing the type of work featured in their school system. Ponca City is in the oil belt of Oklahoma, and the Night School instruction is framed or outlined to fit the needs of this vocation. Mr. F. R. Holbrook, supervisor of industrial arts, Pawhuska, gave an interesting paper on, "Interesting the Public in the Manual Training Department." He sold the idea by getting support of the various civic clubs and merchants through certain exhibits and pictures. Prof. O. B. Badger, of the A. and M. College at Stillwater, read a paper on, "Manual Training Teachers' Organizations in Other States." In Mr. Badger's second address, he outlined the different methods used in the grade shops. His paper gave the advantages and disadvantages of the group and individual methods. Dr. Wm. T. Bawden, associate superintendent of schools of Tulsa, made the statement that shop and industrial arts courses grow faster than any other department in the city schools. He spoke in brief of the industrial conferences held in other states, and the great interest brought about, through organizing an industrial arts club in Tulsa. He stressed the importance of being a member of the National Society of Industrial Teachers, or of the regional organization in which the teacher might live. Hon. Chas. W. Briles, state director of vocational education, Oklahoma City, gave a number of reasons and benefits to be derived from the consolidation, or merging, of the various phases of vocational home economics, vocational agriculture, vocational trades and industries and manual arts in the state. Mr. A. W. Homung, instructor in the Oklahoma City High School, read a paper on "Shop Training versus School Training." He gave a review of the apprentice method, showing the very meager way of obtaining information in the trades, and stressed the merits of the American school system, which is looked upon as the greatest institution we have. Hon. R. O. Small, director of vocational education of Boston, was the principal speaker before the general assemblies and the various conferencs.

A committe of two was appointed from each organization—the Industrial Education Division, the Manual Arts Section and the Trade and Industry Section of the Vocational Educational Society—to work out a plan of consolidating the above groups into an industrial education section of the O. E. A.—Hugh Morris.

NEW YORK VOCATIONAL COUNCIL

The New York Vocational Teachers' Council held its eleventh annual meeting in Manhattan Borough, New York City. Officers elected at the meeting were:

President, Henry G. Osborne, Murray Hill Vocational School, Manhattan; Vice-President, John J. Dieterich, Vocational School for Boys, Manhattan; Secretary, Miss Wilhelmina Liebler, School No. 119, Manhattan.

Vocational School Interests and Legislation Committee: Paul Augustine, chairman, Manhattan; Miss Grace V. Sauer, Manhattan; Harry Harms, Manhattan, and Miss Theresa Simar, Manhattan.

The Council holds regular meetings the first school Friday of each month, with the exception of July and August, at 247 Lexington Avenue, New York City.

THE WESTERN ARTS MEETING

The Western Arts Association will hold its annual meeting May 5, 6, 7 and 8, at Memphis, Tenn. The convention headquarters for the association will be in the Claridge Hotel, while the exhibits and meetings will be taken care of in the new two-million-dollar municipal auditorium.

The general sessions of the programs are planned to be of interest to the entire membership and the best talent has been secured to discuss vital educational topics. Sectional meetings for each department will be provided for the discussion of specific problems of interest to the special teachers. These meetings are of the following departments. Fine arts, manual training, household arts, printing, vocational training and teacher training.

The chairman of the art round table has prepared a strong program which will be represented by a leading art educator as speakers. Mr. Henry Turner Bailey will give a number of short talks at the general session on Wednesday evening and again on Thursday. Miss Anna Horton of Cleveland, will give an illustrated talk on "Developing Art Appreciation;" Miss Florence Fitch of Indianapolis, will talk on "Appreciation Through Music;" Miss Mary Robinson of Washington, Ind., will discuss "Art Weeks and Their Results," and Mr. Franz Aust, of Madison, Wis., talked on "Democratization of Art." Others who will speak are Mr. E. Woodward, of New Orleans, La.,

Mr. Otto Zahn, of Memphis, and Miss Floy Hanson, also of Memphis.

The visitors will be treated to automobile rides about the beautiful parks and speedways of Memphis, visiting the normal school, university, important commercial plants, furniture factories, mills and chemical works.

VOCATIONAL EDUCATION SOCIETY OF BOSTON

The Vocational Education Society of Boston held its regular monthly meeting February 14th at the North Bennett Street Industrial School, 39 North Bennett Street. The large attendance was an indication of the extent to which the members of the society appreciate the annually-extended hospitality of the school. The luncheon, prepared on the premises, was served by pupils; and a boys' orchestra furnished music. To Mr. George C. Greener, the director of the school, a vote of thanks was extended.

The speaker of the day was Professor J. Frank DeChant, vice-president of the Sheldon School of Business Science, and his topic was "Personal Efficiency." He pointed out the fact that everything we do is governed by law. There are several types of law, the distinctions between which should be always kept in mind. First comes fundamental or natural law. This is absolute, and can not be broken. A second kind is statute law, which is not universally the same, and which as a man-made institution cannot be of perfect rigidity in its application. A third kind is conventional law, the law of custom.

Personal efficiency depends upon fundamental law, and may be attained only by a realization of and adherence to it. Its manifestations in the business world may be put into the shape of formulae. An important formula of this nature is to the effect that Efficiency Value is equal to the Individual Value minus the Supervision needed (EV=I—S). One's work is a factor in his value, but is not the measure of it. A man might conceivably work hard and earnestly, and yet require so much supervision that the employer suffers a loss instead of a profit through having him do the job at all. If a 40-a-week man wishes to have his wages raised to $45, he can achieve his desire if he can reduce the cost of his supervision by five dollars. It may be that he is receiving $40 for his work, and someone else is receiving $5 for supervising it. The need for supervision can be traced back to errors—either of omission or of commission. The former are commonly more costly. The service which any man renders may be measured by the value of his work minus the cost of his errors.

Professor De Chant quoted numerous examples to show that most of a person's limitations are self-imposed. Few if any persons utilize to the maximum the abilities which they possess. The limitations can be removed by intelligent, constructive effort. Such effort must principally follow the line of eliminating errors.

Successfully doing this implies an understanding of errors and their causes. The causes of error may all be reduced to negative qualities: fatigue, ignorance, carelessness, poor health, forgetfulness, and so forth. These qualities may be of the body, the intellect, the feeling, or the will. In each case, however, there is a positive quality for every negative. The way to get rid of the negative qualities and their consequences is to cultivate their respective opposing positives.

Among the most important qualities are those of the will. The positive quality of decision to a greater extent than any other quality makes leaders of men. Every great leader has subordinates who are far brighter and smarter than he. There are three obvious characteristics of every leader: He must know the way, he must keep ahead, and he must get others to follow him.

In conclusion, Professor De Chant emphasized the method by which any man can increase his value. Natural law dictates that this can be done only by developing the positive qualities. Such development can be attained by nourishment plus use. Nourishment alone without use or practice will not be effective. To too large an extent, some theories of education have depended solely upon the nourishment of the faculties which it was desired to cultivate. Professor De Chant prefers to education the allied but etymologically more emphatic word, eduction. Eduction—the leading out of one's innate possibilities—is achieved by nourishment and use. As to the extent of the achievement thus possible, there is practically no limit. It seems to be true that no one can have a real desire to do anything, without having in himself also the capacity for doing it.

Mr. Woods, assistant superintendent of the quincy city schools, and a member of the society, offered the hospitality of the new Quincy Industrial School for one of the regular meetings of the Society. The Quincy teachers have been among the most interested and regular in attendance at the meetings of the Society, wherever held; and their offer to play the part of hosts in their new home will no doubt be accepted later in the spring.

Arrangements were perfected for a trip to the Apprentice School of the General Electric Company at Lynn, to be taken Tuesday, February 24. Some time ago the Society listened to a very interesting account of the history and work of this pioneer apprentice school, given by Mr. Tripp, who is at the head of it.

The March meeting of the Society will be held at the Farm and Trade School, on Thompson's Island in Boston Harbor. This school has an ample campus where it will be possible to have an athletic program as a part of the day's festivities.

—Frederick Ames Coates.

THE VOCATIONAL GUIDANCE MEETING

The annual conference of the National Vocational Guidance Association was held at Cincinnati, February 19 to 22, 1925. The first morning was "Observation Morning" in the offices of the Cincinnati Vocation Bureau, by courtesy of Miss M. Edith Campbell, Director. This Vocation Bureau is one of the outstanding accomplishments in the country. With Mrs. Helen T. Wooley and later Miss Edith Campbell at the head, Cincinnati has led all other cities in research work in vocational guidance.

The National Vocational Guidance Association is instrumental in having many very valuable researches made. The Occupational Research Department is making plans for a systematic survey of occupations in the United States. It is planned to have a clearing house where all information may be coordinated so that duplication will be prevented. This survey of the world's work will enable the child to acquire a background of trade or commercial training, to choose, to prepare for, and enter upon the sort of job at which he will be happy and successful.

Colleges and Universities are doing research to develop more reliable measures of testing, to evaluate methods of measuring temperament, emotional stability, interests and aptitudes, rating, diagnostic tests for special courses, and the personal interview. By working on these problems, it is hoped that pupils can be tested with a greater degree of certainty.

As yet, but four occupations—aviation, agriculture, music, and engineering have been worked out scientifically and adequate tests provided.

Results of some of the vast amount of research being done, were given at the general and sectional meetings. Sectional meetings were held by the

Occupational Research Division,
Industrial Personnel Division,
Placement Division,
High School and Junior High School Division,
Psychological Division.

Joint sessions were held by:
Industrial Personnel and Psychological Sections,
Industrial Personnel and Placement Sections,
Vocational Guidance and National Association of Secondary School principals.

At the luncheon and business meeting the following officers of the Association were elected:

President—Dorothea De Schweinitz, Supervisor of Vocational Guidance and Placement, Junior Employment Service, Philadelphia, Pennsylvania.

First Vice-President—Max Meyer, University of Missouri, Jefferson, Mo.

Second Vice-President—A. H. Edgerton, University of Wisconsin, Madison, Wis.

Secretary—Anne S. Davis, Director of Vocational Guidance, Chicago, Illinois.

Treasurer—Harold H. Bixler, Director of Guidance and Research, Atlanta, Georgia.

Trustees—John M. Brewer, Director, Bureau of Vocational Guidance, Graduate School of Education, Harvard University, Cambridge, Mass.

Mary H. S. Hays, Director, Vocational Service for Juniors, New York City.

Harry D. Kitson, Indiana University, Bloomington, Indiana.

Edward Rynearson, Fifth Avenue High School, Pittsburg, Pennsylvania.

Frederick J. Allen, Ex-Officio, Research Associate, Bureau of Vocational Guidance, Harvard University.

MR. NEWELL TO BOSTON

Mr. C. Edward Newel has been appointed director of manual arts and art education at Boston, Mass., to succeed Mr. Dillaway. The new position is an especially desirable one and carries a salary of $5,000 per annum.

Mr. Newell is also a product of the Normal Art School, from which he was graduated in 1903. He studied psychology at Boston University for two years, and in 1915 was delegated by the city of Springfield to make a study of art education in the principal cities of the country.

MR. C. EDWARD NEWELL,
Director of Manual Arts and Art Education,
Boston, Mass.

Mr. Newell has had considerable experience in supervisory work in art, having filled a number of supervisory positions in cities in Massachusetts and also teaching at the Salem Normal School. Since 1908, he had acted as supervisor of manual arts work at Springfield, and previous to that had filled a similiar office at Saugus. He is president of the Springfield Art League, and is widely known as an art lecturer and author of books and pamphlets on art subjects.

VOCATIONAL EDUCATION AT THE CINCINNATI CONVENTION

The Department of Vocational Education and Practical Arts held two interesting sessions during the meeting of superintendents at Cincinnati, February 24th to 25th. About one hundred men and women, interested in vocational education and vocational guidance, were present, including some of the most important leaders in city and state administration of vocational work.

The meetings, as a whole, lacked that interest and enthusiasm which marks the meetings of the National Society and of the Middle West Association. Whether the men in attendance seemed to feel more largely their responsibility toward general educational problems, or whether the supreme interest of the larger body of superintendents overshadowed the meeting, would be difficult to determine. It seemed clear, however, that the assistant superintendents and the supervisors in charge of vocational work should assert themselves more strongly, and should be given more consideration in the counsels of the Department of Superintendence. If the Department of Vocational Education of the N. E. A. is to trail along as it does at present, it had better hold meetings entirely apart from the Department of Superintendence—a proceeding which does not at present seem desirable.

The first meeting was opened by an address on standardized tests by Mr. H. A. Toops of the Ohio State University, Columbus.

"Our educational aim is primarily that of inculcating in the pupil a 'workmanshiplike character' which shall serve to enable him to make correct judgments in any trade situation. Mere knowledge of a certain number of rules of procedure is not enough; the workman sometimes bumps up against situations which the rule book did not discuss. It is in such situations that 'workmanship character' may assert itself.

"In this process of developing workmanship character nothing is probably so effective as having the pupil score up his own product, and that of his classmates. By noting his classmates' strengths and weaknesses he has forcibly brought to his attention his own weaknesses and strengths respectively. Are his 'square' corners really square, are his drill-holes drilled accurately in the proper locations, are his 'smooth' surfaces really smooth?

A rather enthusiastic discussion of tests as employed in a large number of high schools in various sections of the country was made by Professor A. H. Edgerton of the University of Wisconsin:

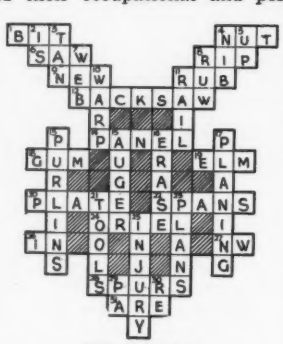
"The broader conception of the Junior High School is based on a philosophy of better occupational adjustment and happier social welfare. Our social and economic needs of today would seem to call for instruction and guidance which aim (1) to challenge and develop the pupils' present interests, aptitudes, and capacities, and (2) to train and educate him for the many sided demands which the future is expected to make upon him. These needs assume that each public school system is obligated to assist all of its pupils by means of suitable curriculums for aiding those who continue their school work to plan their programs more wisely in secondary and higher education, and also for helping those who might find it advisable or necessary to leave school with a minimal amount of preparation to choose their respective procedure more thoughtfully.

"The school must continue to impart certain so-called fundamental skills and knowledge to each pupil; however, its obligation does not end here. It must anticipate the time when the pupil shall have completed his schooling and taken his place in the workaday world. The desired result is too significant to be left to chance. It can come about only by causing the pupil to consider his own assets or capabilities and the various opportunities for developing them. The school must conscientiously and definitely make provision in its curriculums for accomplishing this result.

"During the past few years marked reorganization has been noted in secondary schools throughout the United States. As a result of this tendency, decided changes are found in the purpose, content and method of the activities now provided both in industrial courses as a means of general education, and in classes for preliminary industrial training. It should be noted that school preparation for industrial occupations should always be supplemented by definite instruction on the job, if the best results are to be had."

Mr. C. A. Zuppann of Minneapolis, closed the meeting with a discussion of the use of standardized tests of the work of students in the shop courses of the Minneapolis junior high schools. The school authorities are developing a complete series of objective tests, which are of specific help in vocational guidance, as well as in determining the student's success in carrying on his work.

In the second session on Wednesday afternoon, Mr. C. E. Myers discussed the application of standard tests to vocational agriculture, and Mr. Carl Cotter of Toledo presented an interesting account of a manual training survey, which he conducted during the past Fall. Mr. Cotter obtained, from a list of the graduates of the Toledo high school since the establishment of the manual training courses, some forty years ago, an opinion on the value of the work directly in their occupations, and indirectly in their success in life. The study revealed an unusually high percentage of men who attribute very much of their occupational and personal success to the work which they did in the manual training department. A large number have directly engaged in industrial engineering, building construction, and other occupations in which a knowledge of tools, materials, and trade processes is essential.



SEE PAGE 149.

The meeting closed with a paper on Objectives in Industrial Education by Mr. M. M. Proffit, newly appointed specialist in industrial education, U. S. Bureau of Education.

The representative of the Council for Vocational Education, made up of representatives of the various associations, held several meetings during the convention, and advanced the general cause of closer cooperation between the organizations.

SCHOOL SHOP ACTIVITIES HERE, THERE, AND EVERYWHERE

1. Loom weaving is an interesting and successful school activity in Oakland, California, where it is carried on as a part of the industrial arts in particular in the Elmhurst School. 2. Period furniture of high artistic value is made in the Ramon Baldorioty de Castro Technical School, San Juan, Porto Rico, under the direction of Mr. Herman Hjorth. 3. The Lane Technical High School, Chicago, Illinois, has a most efficient foundry. 4. An automobile class in the School of Industrial Arts, Trenton, N. J. 5. The College of Industrial Arts, Denton, Texas, has a successful department of industrial arts in which only women are entered as instructors and students. 6. Exhibit of work done by seventh grade students of Mr. E. H. Crussell, Sacramento, Calif. 7. Toys made by seventh grade students of Mr. A. Radtke, Milwaukee, Wis. 8. Exhibit of articles made by students, Manchester, Mass.—Mr. S. Henry House, instructor. 9. Pottery and manual training exhibit, Salt Lake City, Utah. 10. Model house for teaching house framing and architectural drawing, Bessemer, Mich. 11. Pottery and metal work, Oregon

Agricultural College, Corvallis, Ore. 12. An antique ship model cabinet (English, 17th century) at the Metropolitan Museum of Art, New York. 13. One of the loom rooms, Rhode Island School of Design, Providence, R. I. 14.—a., b. and c. Bench metal products by students of Mr. Edward Berg, Milwaukee, Wis. 15. Breakfast set by students of Mr. R. M. Gubsch, Columbus, Ohio. 16. Manual training projects made by students of the Webb Consolidated School, Webb, Iowa—R. W. Wagner, Superintendent of Schools. 17. Tools made by manual training class, Auburn, Washington, High School—Mr. H. W. Smith, instructor. 18. Wood turning projects by students of Mr. A. B. Stringer, Triadelphia District, Wheeling, W. Va. 19. Woodworking shop in the Vocational High School, Virginia, Minn—Mr. H. J. Wieland, instructor.

NOW, ARE THERE ANY QUESTIONS?

Replies to questions will be made only when the name and address of the correspondent are stated. Most questions are not of general interest and replies are made by letter.

Wood Grain

Q. 498. Is it possible to see by looking at a piece of hand smoothed or planed timber which way the grain of the wood runs; that is, in close grained pine?—B. N. W.

A. Complete information concerning the grain of wood with special reference to spiral and diagonal grains will be found in the following publications which are available from the U. S. Forest Products Laboratory, Madison, Wisconsin:

The Grain of Wood with Special Reference to the Direction of the Fibers by Arthur Koehler, specialist in wood identification, U. S. Forest Products Laboratory, Madison, Wisconsin. Reprinted from the Aerial Age Weekly of August 12th, 1918.

Factors Affecting the Strength of Wooden Members by Arthur Koehler. Special Mimeographed Bulletin of U. S. Forest Products Laboratory, Madison, Wisconsin.

Art Metal Instruction

Q. 509. We are planning to revise our course in sheet metal and art metal, and desire an outline of the work given by Mr. H. M. Dexter in the Grand Rapids school.—C. McN.

A. Sheet metal and art metal work conducted in the writers' classes is being done as follows:

From fourteen to twenty boys are handled in each class, the number varying according to the age. Larger classes could be organized if the boys were all above thirteen years of age. In each class a few are working at sheet metal, others are doing ornamental iron work, and still others are working at art metal problems, with metals like copper, brass, and nickel silver. The groups change the work periodically so that each boy has a chance to handle each of the materials and all of the tools.

The boys who are doing ordinary sheet metal work make floor mopping pails, waste paper cans, garbage cans, bean bag boards, automobile creepers, baseball targets, stain cabinets, and other smaller articles. Some of the things are provided for the schools and others for the municipal playgrounds.

The articles made of ornamental iron include umbrella stands, floor lamps, candle-sticks, etc.

The articles which are made for the municipality, or for the schools, are made from materials furnished by the board of education. In this way the boys are getting experience in metal working without waste of materials, and the schools are obtaining necessary articles at no cost except materials.

The first piece which a boy makes in art metal work is usually a napkin ring, an envelope opener, or a pin tray. After finishing the first article, the student is permitted to make a pair of salt shakers of nickel silver or a flower vase of copper or brass. Before the student has completed the second article, the teacher has an excellent understanding of his ability and of the possibility of allowing him to make a more difficult piece. The articles which boys are allowed to choose from for their third project includes bowls, serving trays, cake platters, table lamps, floor lamps, cups of all sizes and descriptions, coffee pots, writing desk sets, jewel boxes, candle-sticks, hall lanterns with art glass, table and teaspoons, fruit knives, incense burners, powder boxes, sugar bowls, creamers, clock cases, water pitchers, torchieres, and other useful articles for the home. A popular problem is a boy scout canteen.

The problems are chosen to give boys experience in all the processes of art metal smithing and also in raising and shrinking of metals, metal spining, hammer finishing, electro plating of copper, nickel, and silver, oxidizing, bronzing, and finishing copper in green and mahogany colors. The processes also include polishing and buffing, hand burnishing, engraving, etching, and chasing.

In joining metals, brazing, riveting, and soldering are commonly employed.

The periods for pupils working in the shop are based on the grades and their general conditions. Generally the boy in the seventh grade is given two periods; in the eighth grade, three periods; in the ninth grade, five periods per week. Each period consists of 90 minutes each. The cost of material for each pupil is about two dollars a semester.—H. M. Dexter.

NEW YORK SCHOOL CRAFTS CLUB

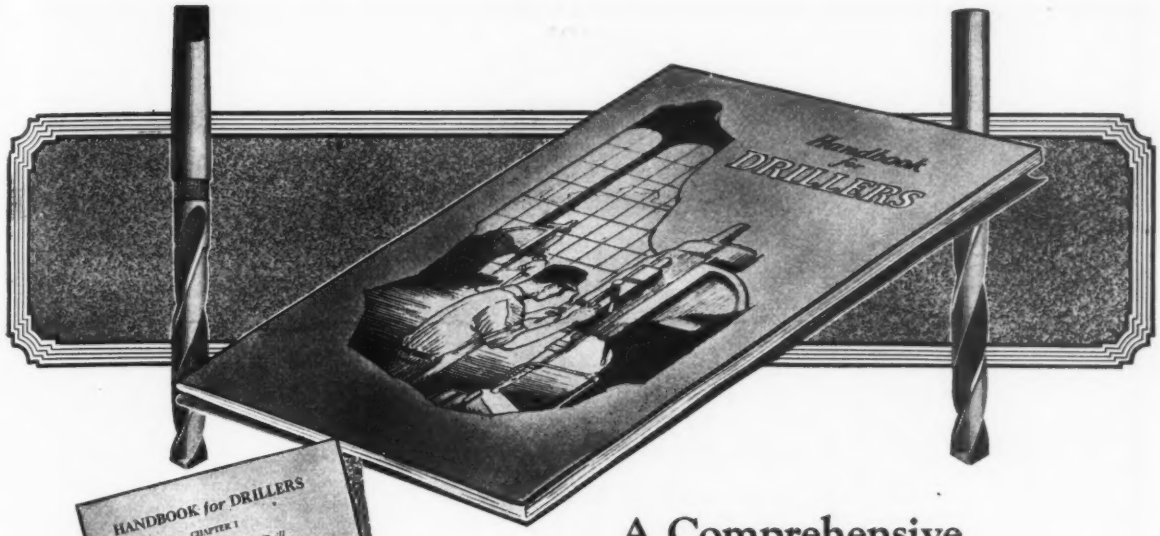
Cooperation is the ability of the teacher to become a harmonic member of a faculty. The February meeting brought out some of the phases of cooperation which make teaching worth while. No craftsman should hold aloof for he is needed and should fill his place completely. The School Crafts Club met on Saturday, February 28th, at the Ethical Culture School. Two members were received into membership: Mr. A. George Hanson, New York City; Mr. William L. Hagen, Mount Vernon, N. Y.

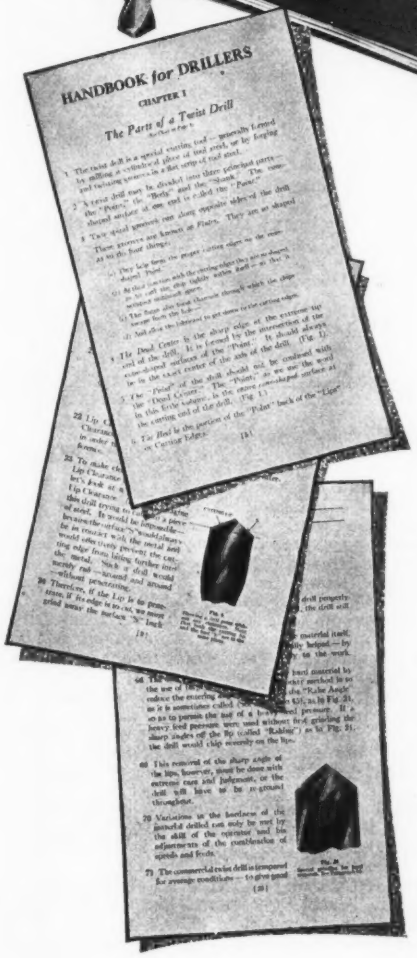
Mr. Frederick C. Arnold, president, announced the remaining meetings of the year will be held on March 28th and May 2nd. The April meeting is postponed due to a conflict in dates with the Eastern Arts Association.

There are many principles fundamental to art design which are helpful for industrial arts teachers to know. These were explained and illustrated by Mr. Morris Greenberg, head of the Art Department of the Commercial High School of Brooklyn. Art is emotion passed through the intellect and embodied in a piece of workmanship. Thus there are three important H's: Heart, Head, Hand. Successful works are not the result of sudden inspirations only, but the result of emotion embodied in a product by conforming to certain laws of design. These principles are predominance, subordination, rhythm, balance, fitness and harmony. Mr. Greenberg illustrated the application of these laws by means of charts, and by drawing with colored chalks upon large sheets of cardboard. These may be applied to printing, project design, and furniture design in industrial arts work. An automobile designed in 1909 appears ugly, in contrast with up to date models, because principles of design are subordinated to mechanical design. Radio cabinets as articles of beauty are sold because fundamental laws are followed. One feature of a design should predominate; other features should be subordinate. There should be no competition for attention. A frame should enhance the thing it surrounds, but should be subordinate to the thing itself. The design should be appropriate for the use to which it is put. For example, figures of people should not be on the backs of chairs.

The industrial arts department may cooperate with the English department in a high school. Mr. Charles Raubicheck, chairman of the Department of English at Evander Childs High School, New York City, speaking on the subject "Art in Stage Construction," told how this was possible. There are many discouraging handicaps in connection with staging upon the usual high school platform. These are in regard to stage lighting and placing of drop curtains mostly. Mr. Raubicheck told how the industrial Arts department in his school worked miracles in constructing the proper settings for school plays. One difficult setting called for a look-out platform in the rigging of a ship. This had to be constructed on the stage in a few minutes and presented many difficulties for solution. A group of boys were drilled until the setting could be put up behind the curtain in six and taken down in four minutes. The industrial arts teacher is a big factor in the success of this extra-curricula activity.

Mr. Frederick C. Arnold, instructor in industrial arts at the Evander Childs High School and president of the School Crafts Club, spoke upon the subject, "Art and Shop." He told of opportunities afforded wherein his department cooperated with the arts department. His shop has 24 turning lathes and upon these the classes have turned out many articles used as models or projects for color work. Here is a chance for class problems employing the use of templates. Articles to represent clowns and various other characters, besides models for bowls, vases, and candlesticks were also produced. Mr. Arnold feels that cooperative work of this nature is of mutual advantage.—**Floyd F. Stair.**





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It is the only treatise on the subject offering a comprehensive introduction to the theory underlying the use of the twist drill, illustrating and describing the fundamentals of drilling.

The information contained in this booklet is based on our experience as manufacturers of twist drills for 50 years. Written in a non-technical style, and published for classroom use, "Handbook for Drillers" is now being used as a text in industrial, Vocational and Trade Schools, and by manufacturing establishments maintaining apprentice schools.

A copy will be sent to supervisors and instructors of Industrial and Vocational Education on request.

For Use as a Textbook. Copies of this booklet will be sent instructors, free of charge, in any reasonable quantities for use as a text by the students in machine shop practice.

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NEWS AND NOTES

Vocational Courses. New courses in commercial subjects, printing, machine shop and vocational wood-working have been introduced at Dubuque, Ia., in connection with a reorganized school program.

New Department of Arts and Sciences. Beginning with next fall, a new department will be established at the Rensselaer Technical Institute, Boston, Mass. It will include courses in arts, science and business administration, and will take care of an increasing number of students preparing for executive positions in industry.

Industrial Arts Teachers' Banquet. The Industrial Arts Association of Pittsburgh and vicinity held a banquet on January 29th, which was attended by 59 members. The speakers were J. R. Glenn, L. H. Turner and J. H. Moore. The subject for discussion was Erie and Indianapolis conventions.

New Aid to Education. The Vocational School, in connection with the Part-Time School of Albany, N. Y., have inaugurated a new aid in the shape of a DeVry portable motion picture projector. The machine was first used on January 16th, in the Boys' Vocational School.

Working Child in "Blind Alley" Occupations. A bulletin issued by the White-Williams Foundation, in cooperation with the Junior Employment Service of the Philadelphia board of education, shows that nine out of ten of a group of more than three thousand working children in the city are in "blind alley" occupations. It is pointed out that less than one-third of the children are in jobs calling for memory and judgment, and only about one in ten are in an occupation requiring any training or length of experience to become expert. No specific or general training is being received in forty per cent of the manufacturing, and in twenty per cent of the commercial occupations.

Shop Exhibit. An exhibit of shop work was held at the Senior high school of San Diego, Calif., during the week of January 26th to 31st, inclusive. The exhibit displayed work in the electricity, wood-working, printing, carpentry, machine, automobile and forging shops.

New Teachers' Law. The State Teachers' Association of Texas has recently given its approval to the new law, passed in 1921 and effective in 1925, providing that special subjects teachers shall possess from two to four years' college training. Among the instructors affected by the law are those teaching art, mechanical drawing, shop subjects, and home economics.

New Vocational School. A new vocational school to cost $175,000 is being planned for El Paso, Texas. Messrs. Trost and Trost, El Paso, are the architects.

Simonds Prizes for 1925. To encourage the study of economics, the Simonds Saw and Steel Co., of Fitchburg, Mass., is offering two prizes of $1,000 and $500 for the best two essays on the subject, "Your Prosperity and Mine." The contest is open to residents of the United States and Canada, and the judges are experts in economics, business and related activities.

School Shop Safety. School shops of Detroit, Mich., were recently inspected by the chief factory inspector. The inspection followed a similar survey by the department of safety and engineering, and resulted in a recommendation that safety guards and other equipment be installed at an estimated cost of $1,200.

Vocational Program. An extensive vocational program has been planned for the new Gerstmeyer School at Terre Haute, Ind. The institution is the former girls' vocational school.

Vocational Classes. A total of eighty men were enrolled in the several vocational classes offered in the night school at Winston-Salem, N. C.

Vocational and Part-Time Teachers' Meeting. Thirty-two vocational and part-time teachers of Lansing, Ann Arbor, Adrian and Jackson met at Jackson, Mich., on January 31st, for a conference. There were round-table discussions of subjects of particular interest to vocational and part-time instructors. Mr. K. G. Smith of Lansing, director of the division of vocational education of the state department, and Mr. C. A. Wardner, director of the part-time school, were the speakers.

Trade School Advocated. The Associated General Contractors of Toledo, Ohio., have asked the board of education for a vocational school where instruction may be offered in trade education and allied activities. It is estimated there are 1,300 enrolled in trade, part-time and vocational classes, and the one necessary thing is proper

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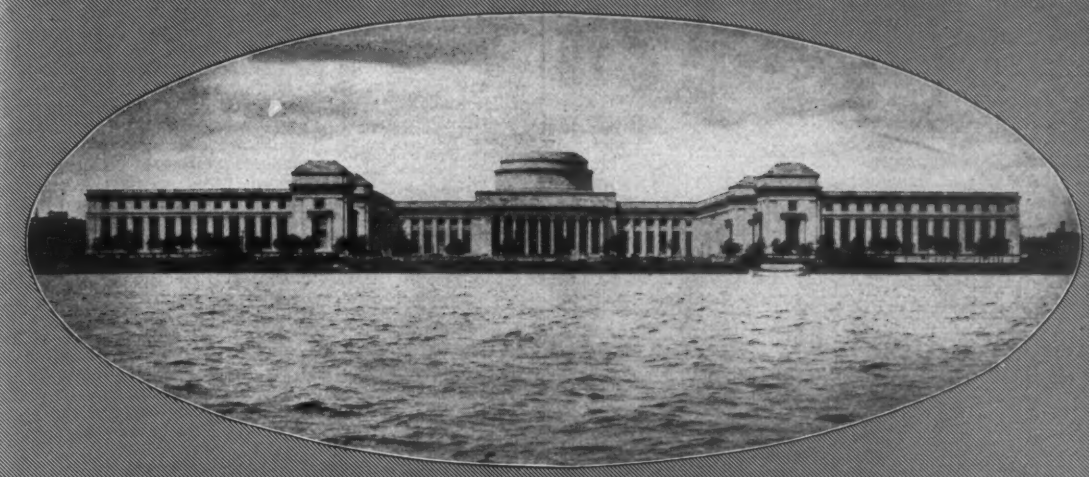

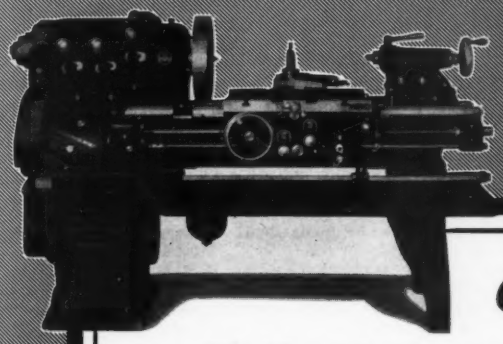

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We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

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Starrett Sets

(Continued from Page 24a)

housing for the students and proper equipment. A factory-type building to cost about $200,000 is advocated.

Student Builders' Work Shown in Exhibit. The municipal exhibit at the Philadelphia Operative Builders' Association Exposition, in the armory, during the week of December 9th, included work done by students of the vocational schools. The exhibits included brick-laying, plastering, carpentry, plumbing, painting and other trades taught by high school experts and men formerly in the building trades. A special room exhibited classwork turned out by the students, and another room displayed labor-saving devices for the proper upkeep of the home.

Vocational Occupation Course. A course in vocational occupations has been introduced in the high school at Wabash, Ind. It is intended as a solution of the problem of interesting boys and girls in occupations, and as a help in finding their respective work for the future.

Plumbing Class Formed. The school board of Fort Wayne, Ind., has approved a recommendation of the master plumbers providing for a plumbing class in connection with the night school. The plumbers' association, under an agreement, supplies the students and the plumbing fixtures, and the board supplies classroom supplies and the instructor.

Vocational Courses Added. Courses in vocational mathematics and automobile mechanics have been added to the course offered in the high school at Houghton, Mich.

Report on Vocational Guidance. A report on vocational guidance and placement work in the public schools of New York City was recently submitted to President George J. Ryan by the Vocational Service for Juniors. The report declares that a complete program of guidance could be carried out in the junior high schools of Greater New York at a cost of about $109,000. The work would require the employment of 42 counsellors, twelve placement counsellors, and six clerical assistants.

Apprentices in Vocational Classes. The Vocational School at Fond du Lac, Wis., has seventeen regularly indentured apprentices enrolled in trade classes. Under the system employed, six months are allowed for a try-out period, during which the boy and the employer "try out" each other. During the past year there has been a large increase in the number of apprentices in the school.

Trade Apprentice School Planned. A new plan for the operation of an apprenticeship school in Portland, Oregon, was recently outlined by A. R. Nichols, supervisor of trades and industries, who is cooperating with the local board of education, the association of building construction, labor unions and other organizations interested in training young men for the building trades. The Buckman School, in Portland, has been placed at the disposal of the vocational board, and the period of instruction has been set at four hours per week. It is estimated that more than 400 apprentices in building trades will be attracted to the school.

New Vocational Shops. In September, next, the new high school at Solvay, New York, will be occupied for the first time. The building is located on a 32-acre site and has accommodations for 800 students. Vocational shops to be included in the structure are wood-working, electricity, printing, sheet metal, automotive repair, domestic arts and science.

Plumbing Class Begun. A vocational class for plumbers' apprentices has been formed at Poughkeepsie, N. Y., to assist the apprentices in forging ahead in their chosen trade. The course has been planned with the approval and support of the master plumbers' association, and will cover a period of three to four years. The subjects for instruction cover mathematics and science as they relate to plumbing, as well as English, spelling and other fundamentals in the trade.

Connecticut Vocational Aid. An allotment of $91,180 for vocational work in Connecticut under federal supervision is provided in an appropriation bill recently reported to the House in Congress. Of the total allotment for the state, $25,929 is to be used for agricultural education, $52,144 for trade industry and home economics training, and $13,114 for teacher-training work.

Steam Engineering Class. A free class in steam engineering has been opened in the Essex County, New Jersey, vocational school. The subjects for instruction cover mathematics, marine engineering, boiler-room efficiency, and handling of safety valves and other appliances.

New Vocational Work. A class in fiber furniture weaving was formed with the opening of the second

(Continued on Page 28a)

Mobilizing an Army of all Types

THE-BOY-AT-THE-STONE with his army of all types (cast in the American mold) is preparing to storm the citadel of illiteracy and ignorance. The ammunition of this army of types consists of books, spelling lists, school papers, scientific notes, etc.—in fact, printed material that will be of interest and value to all readers. The-boy-at-the-stone has a wonderful opportunity. It is necessary, in order to prepare his types for the printing press, that he be a logical thinker, be possessed of skilled fingers, and have an inborn sense of orderly arrangement. Punctuation, capitalization, spelling, division of words, paragraphing, in fact all the rudiments of English construction, are necessary to perfect typesetting; but the-boy-at-the-stone, in addition to this knowledge, is taught manipulative skill, accuracy, and artistic arrangement.

Every technical operation in printing possesses educational value, as it motivates the academic instruction. Abstract studies are made interesting. The printed product has a community as well as a commercial value; and this appeals to the youthful mind because it is being permitted to do that work which is to be judged by others.

There is a printing outfit for every type of school. The cost of the printing equipment may be made to conform to almost any amount. Write to-day for information regarding the type of school in which you are considering the installation of printing. Should you desire a representative to call upon you, the matter may be arranged to suit your convenience. Write now.

F. K. PHILLIPS, *Manager*, EDUCATION DEPARTMENT

American Type Founders Company

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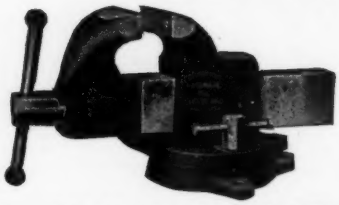
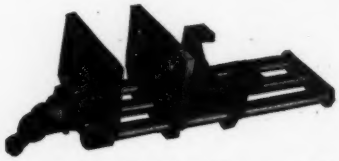
A CORPS OF TRAINED EDUCATORS, ENGINEERS AND SALESMEN AT YOUR SERVICE

COLUMBIAN

VISES A Type to Meet Every Requirement



Columbian Malleable Iron Machinists' Vises will give real service. Made in all standard types and sizes.



Columbian Manual Training Vises are widely used in all wood working industries. Choose the style and size to meet your needs.

Columbian Forged Steel Leg Vises have been a standard in iron working, structural steel and blacksmith shops for years. They are built to withstand the most severe usage.

Columbian Universal Vises will hold work at any angle and are quick-acting in every position. The ideal vise for use by students of cabinet making, pattern-making and woodworking.

Write for catalog.

The Columbian Hardware Co.

World's largest makers of vises and anvils

CLEVELAND OHIO

(Continued from Page 26a)

semester at La Crosse, Wis. Some of the interesting and useful pieces of furniture made in the class are tables, ferneries, writing desks, sewing tables, smoking stands, and reading lamps. An exhibit of fiber furniture made by the pupils of the Washburn school was recently shown for the benefit of interested persons.

Manual Training Class Builds Equipment. The manual training department at Piqua, Ohio, under the direction of Mr. Leo Moore, has completed the building of equipment for the printing department, with a saving of at least 75 per cent in the cost of the equipment. The pieces made by the classes include five type racks, one case and work table for supplies, and one wood and marble work table for use in washing up and inking jobs.

Trade Training in High Schools. Introduction of trade training courses as part of the regular high school work at Akron, Ohio, is proposed by Supt. Carroll Reed in his annual report. At present, vocational training is offered only in evening schools to students often past school age, who are employed at regular trades. Supt. Reed proposes the establishment of high school courses similar to the evening courses, with the addition of a course for aiding students in the selection of a vocation.

Trade Training Becomes Popular. Mr. Lewis Gustafson, of St. Louis, Mo., speaking before the Vocational Education Association recently, declared that "white-collar" jobs are fast losing in favor, and that they are rapidly being replaced by trades meeting the practical needs of a mechanical age. He pointed out that we live in a great industrial and mechanical age, where labor with the hands is not looked down upon, with the result that there has been a definite change from the white collar to the overalls. Even the school teacher has become a carpenter and the preacher has left the pulpit for the plasterer's trowel.

Four-Year Course Defeated. House Bill No. 15, providing for a four-year course at the Idaho Technical Institute, Pocatello, was defeated in the state legislature by a vote of 30 to 25. The arguments for and against the bill took up an entire day's session and was a fight between the north and south sections of the state, one section contending for another school of higher learning and the other holding out for one university for the state.

Ask More Manual Training. The school board of Irvington, N. J., has been asked to extend manual training facilities to two more schools. The subject is being taught in three schools at the present time.

Site for Girls' Trade School. The school board has selected a site for the new trade school for girls, to be erected in Brooklyn, N. Y., at a cost of $237,000. The only girls' school now conducted by the board is the Manhattan Trade School in the Borough of Manhattan.

Boys Construct Furniture. Boys in the manual training classes at the College high school, Greeley, Colo., have finished a number of pieces of fine furniture, among which may be mentioned a Queen Ann rocking chair in black walnut, a quartered oak floor lamp, a black walnut radio cabinet, and checker-board tables inlaid with black walnut, Spanish cedar and maple.

Vocational Guidance Course. A course in vocational guidance is being offered for the first time to boys of the Childress high school at Childress, Tex.

School-Printed Programs. The programs for the recent monthly meetings of the Manual Arts Club at Tulsa, Okla., were designed and printed by the school printshop. The programs were printed on lightweight paper, of a yellow or brownish tinge, and were decorated with a neat border. The type was in brown, in one case and black in the other case.

The Pennsylvania Society for Vocational Education will hold two meetings during the year 1925. The first conference will be held at State College, Pa., August 10th, 11th, and 12th. The second conference will be held in connection with the Pennsylvania State Educational Association in Scranton, Pa., December 29th, 30th, and 31st.

Bureau of Mines Issues New Films. The U. S. Department of Interior, Bureau of Mines, Pittsburgh, Pa., has just completed a group of new films on mining, its various processes, methods of manufacturing and refining, etc., for educational use. Detailed information regarding the films and their distribution can be secured from Mr. R. A. Wood, director of the Bureau of Mines, Pittsburgh.

Issue a Souvenir Calendar. The Goundry School at North Tonawanda, N. Y., has issued a souvenir calendar for distribution to the parents and friends of the pupils. The calendar was designed in the art department, printed

(Continued on Page 30a)

Education Through Wood Working

is founded on the experiences of hundreds of teachers of woodworking in schools of the United States, Canada and the Philippines.

Twenty-two prize winning essays comprise more than half of the book. The balance is devoted to up-to-date methods of modern practice in woodworking entailing the use of machinery.

No teacher of woodworking can afford to be without this book when it is considered that it will be furnished to them at cost.

Education Through Wood Working

contains 354 pages gilded at top, with 150 illustrations, numerous charts, drawings, stock bills, diagrams, etc. The book is 6½ x 9¼ inches in size and is bound in Levant pattern leather, with the lettering in pure gold.

In fact no expense has been spared to make the physical beauty of the book worthy of the unusual quality of its text contents.

Price to teachers and directors of woodworking $2.50.

Other Publications

Issued by us to teachers of woodworking are as follows:

On the Manufacture of a Teacher's Flat Top Desk.
Accompanied by a set of instruction sheets for class room study.

Chats on Period Styles in Furniture.
Issued in series and deals historically with Chippendale, Adam, Hepplewhite, Sheraton and Duncan Phiffe. Only the first three have been printed thus far.

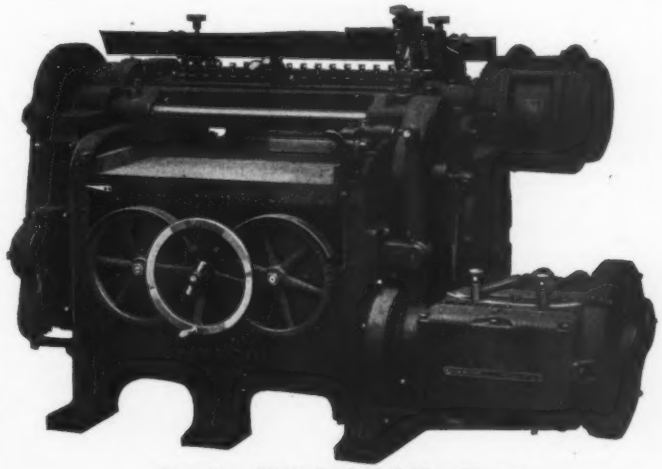
These are free to teachers of woodworking, 25 cents each to all others.

"The Tools of School are the Tools of Life"

American Wood Working Machinery Co.

Educational Department

Rochester, N. Y.



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Michel Jacobs

Director of the Metropolitan Art School of New York.
Author of "The Art of Color."

The Metropolitan Art School under Mr. Jacobs' direction has had extraordinary success in teaching color by a series of systematically graded lessons and exercises.

This series is now available in book form. Teachers, art students, commercial artists and all others interested in color can gain from it the ability to "see" color, and to use it to the best advantage. It is easily understandable, logical, interesting to read and to study—a particularly important contribution to the literature of art. It is a book that no one interested in art can afford to be without.

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Carl L. Svensen's newest book is the first work on lettering featuring the artistic and commercial applications of alphabets. It gives careful instructions in mechanical details, and its unusual application material is worthy of special note. It is illustrated by numerous full-page plates.

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(Continued from Page 28a)

in the school printshop, and tinted with water colors in the art classes. The work was done under the direction of Mr. Wm. V. Winslow, supervisor of industrial education.

Principal A. M. Meyer of the Oxford high school at Oxford, Ind., recently sent out questionnaires to the commissioned high schools of the state. The questionnaires were each three hundred pages in length and sought to determine the status of educational and vocational guidance in the high schools of Indiana. The work was carried out under the direction of the inspection department of the state board of education and the School of Education of Indiana University. The results of the study are expected to prove of value to administrators of state schools.

The Boys' Technical High School of Milwaukee, Wisconsin, has issued a large wall calendar which is distributed to the citizens. It is printed in colors, the work days in brown numerals and the Sundays and holidays in red. Incidentally it advertises "the school that serves the whole city." As a demonstration of the printer's art it is perfect.

Augusta, Kansas. The board of education, at its February meeting, decided to erect a building in connection with the present senior high school to be used for vocational agriculture and the allied courses. Money for the erection of the building, which will cost from twenty thousand to twenty-five thousand dollars, is on hand.

Evening Trade Classes. Evening trade classes in shop mathematics and carpentry has been formed at Newton, Kans., under the direction of the state board of vocational training. In addition to these, two classes in sewing for women have been organized.

Observe Seneca Week in Buffalo. The Seneca Vocational School, at Buffalo, N. Y., observed Seneca Week during the week of February 16th to 20th. The idea of a school week was first tried some years ago and has since been an annual event. School is in session every day during the week, as well as in the evening from 7:30 to 9:30 o'clock. During visiting hours, the pupils act as guides to the parents, taking them through the shops, classrooms and laboratories.

In the vocational school, the pupil devotes one-half his time to actual shop work and the other half to closely related book instruction. Among the trade courses offered are electrical wiring, shop practice, telephony, radio, machine shop practice, tool and die making. The courses are open to graduates of the eighth grades and the instruction is free.

Issue School Catalog. The officers of the Baron de Hirsch Trade School, of New York City, have recently issued a thirty-page pamphlet, describing the activities of the school and the opportunities in trade training which it offers to poor boys. While Jewish applicants are given preference in admittance to the school, non-Jewish young men of limited means are accepted for the present.

Instruction is given in the trades of printing, sign painting, show-card writing, plumbing, machine work, electrical work, automobile mechanics, and stationary engineering. The courses are each five and one-half months in length and instruction is given only in day classes.

New Salesmanship Course. A new course in the science of salesmanship is being offered in the evening school at Miami, Florida, under the direction of Miss Adelaide Lawrence. The course is free to those interested in the science of selling.

Establish Guggenheim Memorial Foundation. Mr. John Simon Guggenheim and his wife have recently announced a preliminary gift of $3,000,000 for the endowment of the Guggenheim Memorial Foundation Fellowships for advanced study abroad. The foundation is a memorial to the deceased son of Mr. and Mrs. Guggenheim and is intended to improve the education and practice of the arts and professions in the United States. The Fellowships are for students somewhat older than the Rhodes scholarship students, including young professors on sabbatical leave, holders of fellowships from individual colleges, and those who have won distinction in graduate study. The amount of money available with each scholarship is approximately $2,500, but may be more or less, depending on individual needs.

Trades Council Favors Vocational Training. The educational committee of the Trades and Labor Council of Lansing, Michigan, has begun work on a program for

(Concluded on Page 32a)

The BEST OF THE LOG *for the* NATION'S PATTERN LUMBER

[CALIFORNIA SUGAR PINE]

A Genuine White Pine

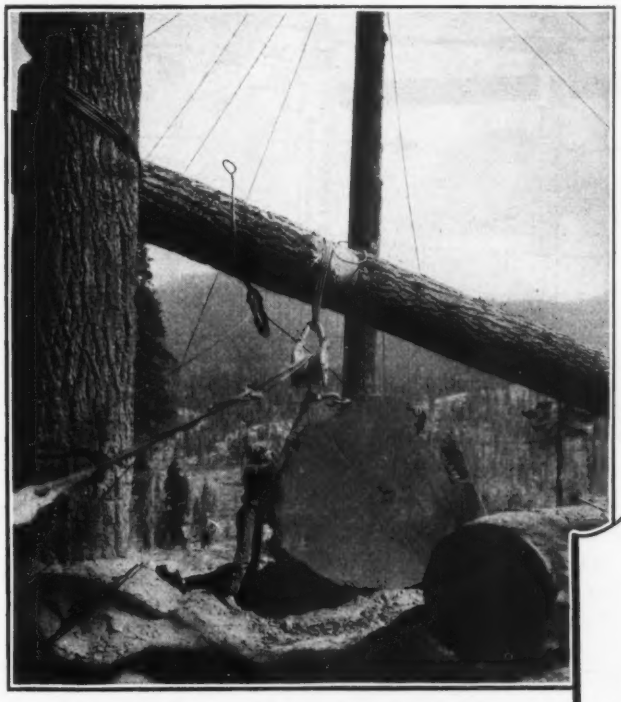
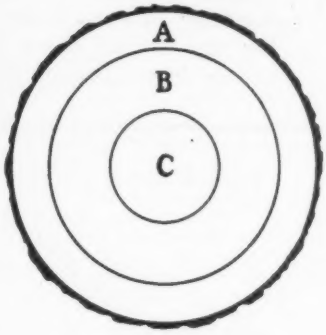


DIAGRAM OF SUGAR PINE GRADE ZONES



A~"Clear" Zone
B~"Shop" Zone
C~Common Boards

Fortunately the widest, thickest and longest pattern stock comes from lumber of remarkably soft and uniform texture, free from disease, and with an absolute minimum of warping or shrinking, *California Sugar Pine* —a *genuine* White Pine.

Only large, old, slow-growing trees are selected for pattern stock. From the outside cuts of these logs come the long, thick, wide boards of clear, soft stock which best meets the exacting requirements for any size pattern.

Sugar Pine "Shop" (cut next to the "clear"), while containing some knots, may be so cut up as to produce pieces of clear stock in sizes ample for pattern use, and the material is of the same high quality as that cut from the clear sections of the logs.

"Common" Sugar Pine excels for flasks, bulkheads, braces, ribs, factory boards and templet lumber.

You can depend upon Sugar Pine—absolutely! It is the Nation's Pattern Lumber—a *true White Pine:* soft, uniform of texture, close-grained, and with the minimum of warping or shrinking. Mills of this Association keep on hand at all times a supply of thoroughly seasoned Sugar Pine lumber. If your dealer has no stocks, write us and we will see that a prompt quotation is made.

The Sugar Pine tree, one log of which is pictured above, scaled out 20,810 feet of lumber. The average diameter of the stump was 103 inches; average diameter 16 feet up was 66 inches; seven logs were taken out, making the total height of 103 feet from which good lumber was available. The small diameter was 51 inches at the top of the seventh log.

BUTT log	3,290 feet	16 feet long	
2nd "	3,290 "	16 "	"
3rd "	3,480 "	26 "	"
4th "	3,480 "	26 "	"
5th "	2,880 "	16 "	"
6th "	2,440 "	16 "	"
7th "	1,950 "	16 "	"
	20,810 feet	132 feet long	

Rings were counted on the stump, and the tree was found to be 443 years old. While not the largest Sugar Pine tree, it produced a very high quality of logs.

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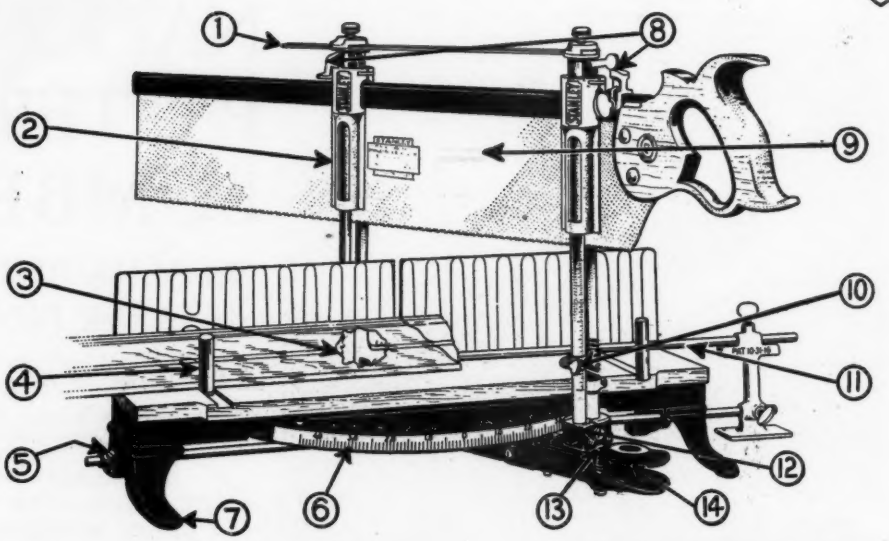

Send for an explanation chart showing this Stanley Mitre Box No. 346 and its 14 outstanding features.

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THE STANLEY WORKS — THE STANLEY RULE & LEVEL PLANT

(Concluded from Page 30a)

placing the workingman in closer touch with educational opportunities. The committee will work in cooperation with a committee of the board, and with those in charge of vocational training and night school work, in making recommendations for educational opportunities for adults, as well as promoting vocational opportunities for children of workingmen.

Pan-American Exhibition. The Board of Supervisors of Los Angeles County, California, and the Board of Governors of the Los Angeles Museum, with the cooperation of patrons and friends of the institution, has arranged a large and representative exhibition of paintings in connection with the opening of the first unit of the new Los Angeles Museum. The exhibition of paintings will open at the Museum on November 3rd, and will continue to and including January 1, 1926.

Oregon Apprenticeship Commission. New rules and regulations have been adopted by the apprenticeship commission established by the Association of Building and Construction of the State of Oregon. The apprenticeship system, under the rules is to have the cooperation of the three principal parties affected in the work, i. e., the employer, employee, and the public. The apprenticeship commission is to be a representative group, comprising five employers, five employees and three neutral members. It is planned to employ a paid secretary and to maintain headquarters for the enrollment of apprentices and for the handling of such other details as may be found necessary in the work of the commission and subcommissions.

The subcommissions will be given the duties of grading and promotion of apprentices, the examination of apprentices, the development of instructional facilities and the setting of standards of training and efficiency for each particular job, the enforcement of discipline of attendance, and the handling of violations of the terms of apprenticeship.

The coordinator is an ex-officio member of the commission. He is to be appointed with the approval of the school board and the state vocational board, and his salary is to be paid by the state board. He will keep the records of performance of apprentices while in school and will act as the spokesman between the parties concerned.

Under the system, the school board provides the headquarters, as well as the necessary equipment to carry on the work; the state board trains and provides the teachers and pays their salaries; the federal officials supply the necessary teaching funds under the Smith-Hughes law, and the building industry furnishes all material used by apprentices and necessary to their manual work while in the school.

PERSONAL NEWS

Mr. N. S. Hunsdon has returned to his former position of Director of Vocational Education for the State of Texas. Mr. Hunsdon succeeds J. M. Hall, who resigned to become Federal Agent for Trade and Industrial Education in the southern states.

Mr. Glen D. Brown has been appointed business director of the schools of Muncie, Ind. Mr. Brown in addition to being director of business will retain his office as vocational director. He is a graduate of Terre Haute division of the Indiana Normal School and holds an advanced rank at Indiana University. He served for some time as assistant vocational director before he was made director of the department.

Dr. Lindsay Blayney has been installed as president of the College of Industrial Arts, Denton, Tex. Dr. Blayney succeeds the late W. F. Bralley.

Mr. L. A. Hartley, formerly state supervisor of trade and industrial education in Nebraska, resigned on February first to become director of education for the National Founders' Association in Chicago. The new position carries a larger salary and offers opportunity for a large, nation-wide service.

Robert S. Hilpert, formerly instructor in applied arts at the Technical High School, St. Cloud, Minn., has accepted a similar position in the Department of Trades and Industries, College of Education, University of Minnesota.

Charles P. Coates, who formerly had served for 20 years in the schools of St. Louis, Mo., has accepted a new position at Los Angeles, Calif.

Mr. J. E. Yocum, who previously had been employed by the public schools of Oakland, Calif., has accepted a position at Los Angeles.

Mr. Gerald C. Roberts has been appointed as a teacher of manual training at Buffalo, N. Y.

Mr. Charles K. Peacock, formerly director of manual arts at Chattanooga, Tenn., has accepted the position of assistant executive of the Chattanooga Council of Boy Scouts. Mr. Peacock is succeeded in his former position by Mr. H. N. Willard.

Howard G. Olivit, instructor in trade pattern making at the East Technical High School, Cleveland, Ohio, died after a brief illness on January 6, 1925. He was not only an able instructor, but a fluent writer on subjects of an industrial educational character. One of his recent articles appeared in the INDUSTRIAL-ARTS MAGAZINE for February entitled "A Trip With Mr. Brown," in which he dramatizes an interesting trade school situation.

Quoting Mr. Solar on the Decorating of Toys

Mr. Solar says on page twenty-six of his excellent text, "Hand Craft Projects;"

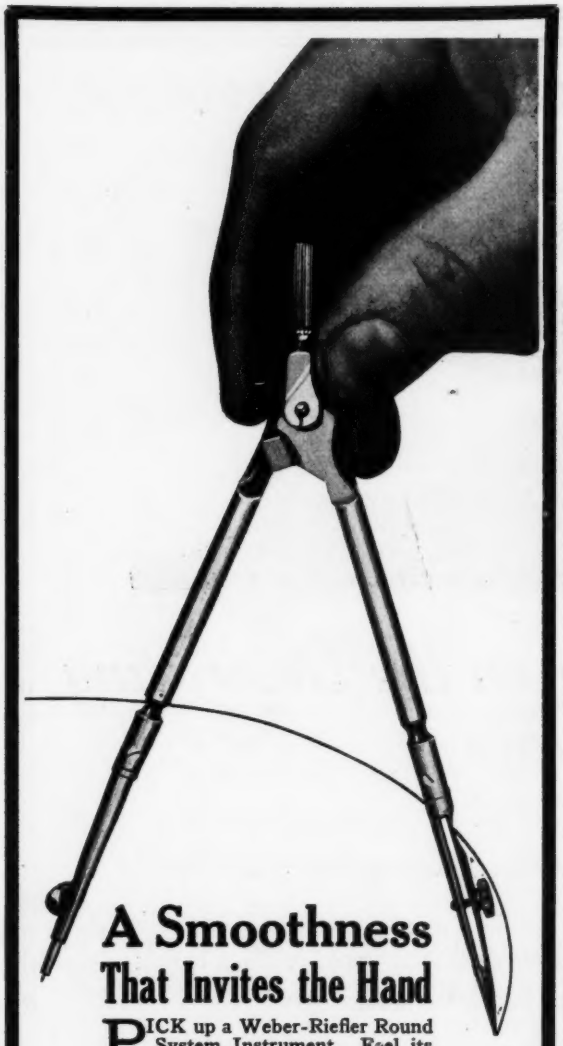
"Show Card colors dry quickly, and if covered with a quick drying white varnish, are excellent for decorating toys."

As you know, half the trick in making a clever toy is in the finish you choose.

Therefore, use for this purpose the brightest and most brilliantly satisfying medium on the market -- "Prang" Tempera, the better Show Card Color.

The
AMERICAN CRAYON COMPANY
SANDUSKY · OHIO · NEW YORK ·

"Old Faithful"



A Smoothness That Invites the Hand

PICK up a Weber-Riefler Round System Instrument. Feel its firm, strong smoothness, notice its marvelous balance and how it seems to fit right into your hand. These are instruments, that respond accurately to every move of the fingers. There are no sharp corners,—the Round System has eliminated them and you can give them hours of continual use without the slightest discomfort to your hand. The absence of all unnecessary parts and the simplicity of design make Weber-Riefler Round System the pleasantest of instruments to work with. The next time you pass your drawing supply house ask to see a set. Write for catalog of complete Weber line. Address Dept. I.A.

F. WEBER CO.,
1220 Buttonwood Street, Philadelphia
St. Louis Baltimore

WEBER

Drawing Instruments & Materials

The Original Round System

TRADE PUBLICATIONS

Issue New Bulletin. J. D. Wallace and Co., Chicago, have just issued a very interesting circular, broadside in imitation rotogravure, entitled "The Woodworking Pictorial." This bulletin describes and illustrates the various Wallace Portable Woodworking Machines in action. These machines are small compact units which can be operated with perfect confidence. The motors are built into the machines and directly connected. The photographic section shows typical uses of the Wallace portable installations, indicating the saving of space, labor and time, in the school shops as well as in industry, where stationary machinery is not of maximum use.

Machines and Tools for Sheet Metal Work. The standard catalog of machines and tools for sheet metal work in American schools is that issued by Peck, Stow and Wilcox Co., Southington, Conn., and Cleveland, Ohio. It is no exaggeration to say that the catalog contains nothing but standard accepted machines and tools and accessories, and is an indispensable handbook for every teacher. The newest edition, which is entitled 25A, contains as a special service for teachers, a vocational supplement in which the educational values of sheet metal work are discussed. A complete shop analysis of a series of basic problems, and lists of standard equipment are included. Copies of catalog No. 25A will be sent to any reader of the **Industrial Arts Magazine** upon request.

Grinding Thin High-Speed Steel Knives in a 24-page pamphlet just issued by the Simonds Saw and Steel Company of Fitchburg, Mass. Woodworking instructors who operate planers using thin knives should get a copy of this booklet, both for their own information and for the use of the men who grind their knives. It tells in detail how to grind in the proper manner to retain the full benefits of a sharp, high-speed steel cutting edge. The booklet also contains many useful hints regarding the structure of the high-speed steel knives and the use and care of the knives. It will be sent gratis to any reader of the **Industrial Arts Magazine.**

Trade Catalog of Keuffel and Esser Company. A catalog issued by Keuffel and Esser Company, manufacturers and importers of drawing materials and instruments, New York City. Thirty-sixth edition. Cloth, 482 pages. Prepared and issued by the company at 127 Fulton Street, New York City.

The present volume is a general catalog of drawing instruments and supplies issued by the firm in a very compact and usable reference form. It lists and describes such items as drawing and detail papers, tracing cloth and papers, blue print papers, profile papers and cloths, cross-section papers and cloths, coordinate paper, federal aid sheets, blanks for the building trades, drawing instruments, protractors, boxwood scales, rules, triangles, ship and railroad curves, straightedges, T-squares, drafting-room furniture, electric blue print frames, drawing boards and tables, inks, brushes, lettering pens, pencils, calculating instruments, slide rules, planimeters, levels, sextants, surveying compasses, sight compasses, aneroid barometers, automobile aneroids, anemometers, leveling rods and ranging poles, plumb bobs, binoculars and magnifying glasses, measuring tapes and hypometers. There is also a list of reference books on the slide rule and on planimeters, together with a complete index by number and subject.

The firm also issues a special supplemental catalog, devoted to drawing instruments and materials for use in high schools, preparatory schools and manual training shops. This list is issued in the form of a paper booklet and lists such important items as materials and tools, mathematical and surveying instruments, measuring tables and instruments for forest work.

School authorities who are interested in tools and materials of this character should address the Keuffel & Esser Co., at 127 Fulton St., New York, N. Y.

Exhibit Wood-Working Machine. The Simplicity Woodworker, manufactured by the Combination Woodworking Machine Co., Chicago, Ill., was exhibited at the eleventh annual convention of the Vocational Education Association, held at the Hotel Sherman, in Chicago.

DIXON BOSTON OFFICE MOVES

The Joseph Dixon Crucible Company, Jersey City, manufacturers of graphite products, pencils, lubricants, crucibles, and paint, announce the removal of their Boston office from 49 Federal Street to 80 Federal Street—the new Chamber of Commerce Building.

The staff of the Boston office includes H. A. Nealley, district representative; Guy W. Hart and Wm. E. Haggerty.